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FIELD MANUAL

AERIAL OBSERVER TECHNIQUES AND PROCEDURES

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AERIAL OBSERVER TECHNIQUES AND PROCEDURES

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*This manual supersedes FM 1-80, 17 December 1968, including all changes.

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CHAPTER 1

INTRODUCTION

1-1. Purpose

This manual provides guidance to aviators, aerial observers, and others concerned with aerial observation missions. It explains the techniques and procedures used in visual aerial surveillance and provides information from which basic aerial observer skills may be developed.

1-2. Scope

a. This manual describes the planning and conduct of aerial observation missions. It sets forth the techniques and procedures required to qualify selected personnel to effectively observe from Army aircraft. For detailed guidance to qualify aerial observers, see ASubjScd 1-8. The discussion contained herein is focused on visual observation methods. FM 30-20 provides information on aerial reconnaissance and surveillance by electronic or photographic means.

b. The contents of this manual as it applies to techniques and procedures falls within the doctrinal concepts of the surveillance, target acquisition, and night observation (STANO) system.

c. The information contained herein is applicable to general, limited, and cold war situations.

d. Users of this manual are encouraged to sub-

mit recommended changes and comments to improve the publication. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Comments should be prepared using DA Form 2028 (Recommended Changes to Publications) and forwarded direct to the Commandant, United States Army Aviation School, ATTN: ATSAV-DL-L, Fort Rucker, Alabama 36360.

1-3. Objective and Missions of Aerial Observation

a. The objective of aerial observation is to provide timely information to the supported commander through missions performed by Army aviation units employing aerial observers. Aerial observation is characterized by the ability to operate free of terrain interference, to conduct observation over large areas, and to adjust rapidly to new requirements.

b. Aerial observation is employed in—

- (1) Aerial surveillance.
- (2) Aerial reconnaissance.
- (3) Special missions.



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CHAPTER 2

BASIC PRINCIPLES

Section I. GENERAL

2-1. Tactical Application of Aerial Observation

a. Army aviation is employed by the commander to supplement his ground observation means and to improve the observation capabilities over his area of influence and interest. Observation coordinating both aerial and ground means provides the commander a more complete coverage of his area of influence and interest.

b. Aerial observation is an inherent part of all Army aviation missions. Commanders utilizing Army aviation should consider this potential in their intelligence collection efforts.

2-2. Capabilities

Aerial observation is a primary capability of Army aviation. Properly employed, it increases the combat effectiveness of the supported ground unit by—

a. Providing greater observation coverage and, therefore, greater security within the commander's area of influence and interest.

b. Avoiding the obstacles and other restrictions normally encountered in ground observation and reconnaissance.

c. Accelerating the accumulation, reporting, and dissemination of information by extending its ground reconnaissance capability.

2-3. Limitations

Factors that limit and affect the accuracy and completeness of the information obtained by aviator-observer teams are—

a. Weather. Weather conditions which produce poor visibility may affect accuracy and completeness of information or prevent its collection by visual observation methods. Use of electronic or photographic observation methods, such as side looking airborne radar and infrared devices, can lessen the effect of this limitation, provided the aircraft can be operated along the desired flightpath.

b. Air Defenses. Enemy air defense systems may deny access to certain areas. Flak suppression programs and local air superiority may reduce the effectiveness of enemy air defenses and facilitate the accomplishment of essential observation missions.

c. Loss of Secrecy. Increased aerial activity over a specific area may indicate to the enemy the intentions of the ground commander. Proper employment of counterintelligence measures and careful cover and deception planning of observation missions will lessen the effect of this limitation.

d. Terrain. The primary terrain limitation involves those areas having dense vegetation such as jungles, and areas having terrain obstacles such as high hills or mountains which mask or restrict visual observation. Natural restrictions may have similar effects on the various electronic or photographic observation methods.

e. Night and Reduced Visibility. The hours of darkness and periods of reduced visibility caused by smoke, haze, fog, dust, etc., may reduce the effectiveness of visual observation. Since electronic or photographic observation methods are affected less by these limitations, they may be used more extensively than visual methods during these periods of reduced visibility and at night. Illuminating flares and/or searchlights may be used for night observation missions.

f. Quality and Proficiency of Aerial Observers. Complete and accurate information by visual observation methods is at best difficult to obtain. Aerial observer training must be complete and continuous in order to assure acceptable mission results.

g. Radio. Aerial observation operations rely heavily on radio, both in planning and executing missions. Indiscriminate use of radio without employing proper communications security procedures can lead to the compromise of aerial observation missions and thus reduce their effective-

tiveness. The reliance on radio when making reports of critical information renders this communication means particularly susceptible to enemy electronic countermeasures (i.e., jamming and deception) unless aviator-observer teams are

proficient in electronic counter-countermeasures. (See FM 32-5 for details on communication security. Electronic countermeasures and electronic counter-countermeasures are discussed in FM 24-18 and FM 32-20.)

Section II. OBSERVATION METHODS AND CATEGORIES

2-4. Methods

The two methods used to conduct aerial observation are—

a. Visual observation, which is a rapid means of collecting intelligence information through observation by flight crews, sometimes aided by the use of binoculars, mechanical ranging devices, and light amplification devices.

b. Surveillance and reconnaissance by electronic or photographic means, which is a method of collecting intelligence information using aerial platforms specifically equipped with cameras and various electronic devices, such as radar and infrared sensors.

2-5. Categories

Visual aerial observation missions include *aerial surveillance*, *aerial reconnaissance*, and *special missions*.

a. *Aerial Surveillance*. Aerial surveillance is the systematic observation of air or surface areas to obtain information to be processed into intelligence. Aerial surveillance missions provide the supported commander with current information by keeping a systematic and repeated watch over a well defined area for the purpose of detecting, identifying, locating, and reporting any information of military value. These missions normally are flown on a regular schedule, with individual flights overlapping to insure complete coverage of the area. A surveillance mission is characterized by the greater expanse of terrain that it covers and the repetitiveness with which it is flown. The major advantages of surveillance missions are their ability to—

(1) Cover large areas rapidly and continuously with minimum expenditure of resources.

(2) Maintain continuous surveillance over a large area while flying over friendly positions, thereby decreasing aircraft vulnerability to hostile air defense measures.

(3) Observe movement or other changes as they occur on the enemy side of the FEBA to keep the commander continuously informed of significant enemy action.

(4) Identify specific areas for further obser-

vation by either aerial or ground reconnaissance measures.

b. *Aerial Reconnaissance*. Aerial reconnaissance is a mission to obtain information about the activities and resources of an enemy or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area. These missions normally are flown to obtain specific information of military value without the requirement for continuous coverage and are not flown on a regular schedule. A reconnaissance mission may be developed because of specific information indicating that an area has potential intelligence value or because current or planned operations indicate a specific area warrants detailed coverage. Reconnaissance missions may be on a one-time basis or periodic, but generally they are more restrictive than surveillance missions in size and scope of coverage. These missions normally require penetration of the enemy airspace and are usually flown at low altitudes. The airmobility of the air cavalry squadron (see FM 17-37) makes it ideally suited for reconnaissance missions to great depths and to areas inaccessible to ground units. The major advantage of aerial reconnaissance missions is the added detail they provide by concentrating observation capabilities on a specific area.

(1) *Route reconnaissance*. Route reconnaissance is the careful survey of an air or surface route to determine enemy uses and traffic patterns. A route may be a road, railroad, waterway, airspace, coastal and international borders, or other lines of communication. Route reconnaissance may also be conducted to determine the adequacy of roadways, bridges, and other installations for friendly use. It is normally performed on a point-to-point or town-to-town basis over a selected route which may pass through several search areas.

(2) *Area search*. An area search is a mission conducted to obtain specific information about a general area, monitoring any movement within an area, or detecting military activities. The limits of the area to be searched will be designated and will vary in size depending upon the

tactical type terrain and information sought. The aircraft crew must plan the actual flight pattern to be flown to insure complete coverage of the area and successful mission accomplishment.

(3) *Specific search.* A specific search is the observation of a point or a limited number of points to secure specific information about military, paramilitary, or significant civilian activity.

c. *Special Missions.* Special missions are other observation missions that may assist the commander in the accomplishment of his missions. These missions include such tasks as reconnaissance by fire, contact reconnaissance, aerial column control, and camouflage inspection.

(1) Reconnaissance by fire is accomplished by firing on likely or suspected enemy positions in an attempt to cause the enemy to disclose his presence by moving or returning fire.

(2) Contact reconnaissance is a mission undertaken to locate friendly units that are isolated or cut off from the main force; e.g., a long range patrol out of contact with higher headquarters.

(3) Aerial column control is the airborne

control of surface or airmobile columns by visual or radio contact to enhance rapid movement over unfamiliar terrain, detect obstacles, and to minimize the danger of surprise by the enemy.

(4) Camouflage inspection is the aerial observation of friendly units to determine the condition and effectiveness of camouflage.

(5) Other observation missions may be performed as directed by the commander or the tactical situation; e.g., reconnaissance of a landing zone, topographic survey, radiological survey, and reconnaissance for the escort of airmobile forces.

2-6. Artillery Adjustment

Aircraft employed in aerial observation missions can be used to conduct indirect fire adjustment and target acquisition missions when the requirement exists and the priority of employment permits. Normally, fire adjustment missions for field artillery, aerial field artillery, mortar, and naval gunfire will result from in-flight reports rendered by the aircrew or from an immediate request by a supported unit.

Section III. ARMY AIRCRAFT USED FOR AERIAL OBSERVATION

2-7. General

Although all Army aircraft may perform aerial observation missions, those best suited for such missions are illustrated and discussed in this section. Other service aircraft are also capable of flying aerial observation missions. The advantages of organic Army aircraft are their quicker responsiveness to the needs of the commander; their slower flying speeds; their ability to fly at very low altitudes; and their ability to operate from short, semi-improved landing areas in close proximity to the supported forces. The disadvantages of Army aircraft are their short operational range, limited all-weather capability, and vulnerability to ground fire.

2-8. Rotary Wing Aircraft

a. *Observation.* The observation helicopter is one of the Army's primary observation aircraft. The OH-6 (fig 2-1) and the OH-58 (fig 2-2) are the standard observation helicopters in the Army inventory. These helicopters have only a visual observation capability. They are designed as multi-purpose helicopters and are used for observation as well as command and control, radiological survey, topographic survey, and light resupply missions. These helicopters may be categorized as a part of the STANO system.

b. *Utility.* The UH-1 series of helicopters (fig 2-3) is presently the standard utility helicopter in the Army inventory. Although these helicopters are not designed primarily as observation helicopters, they are capable of performing observation missions if required. Illuminating devices, including flares and searchlights, can be mounted on the UH-1 to enhance its visual observation capability.

2-9. Fixed Wing Aircraft

a. *Utility.* The U-10 (fig 2-4) is a single engine airplane capable of performing observation mission as well as courier service, cargo carrying, and utility transport. It is specifically designed to utilize small, rough, and unprepared fields. Adaptability to floats and skis enables this airplane to operate on water and snow. The U-10 is presently used primarily by special forces units.

b. *Medium Observation.* The OV-1 series of airplanes (fig 2-5) is the standard medium observation airplane in the Army inventory. This airplane has near all-weather visual, photographic, side-looking airborne radar (B and D models), and infrared (C and D models) observation capabilities. The D model is capable of carrying inter-

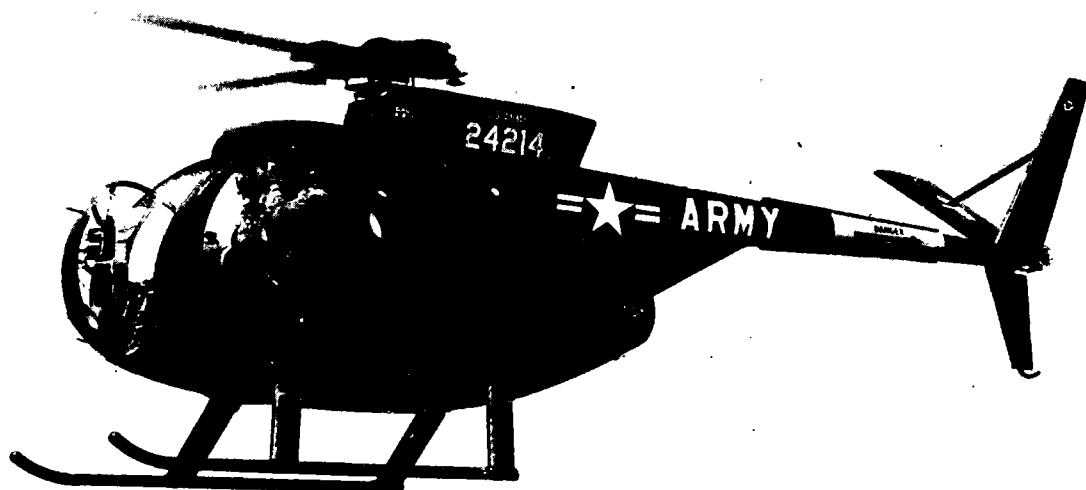


Figure 2-1. OH-6 Cayuse (observation).

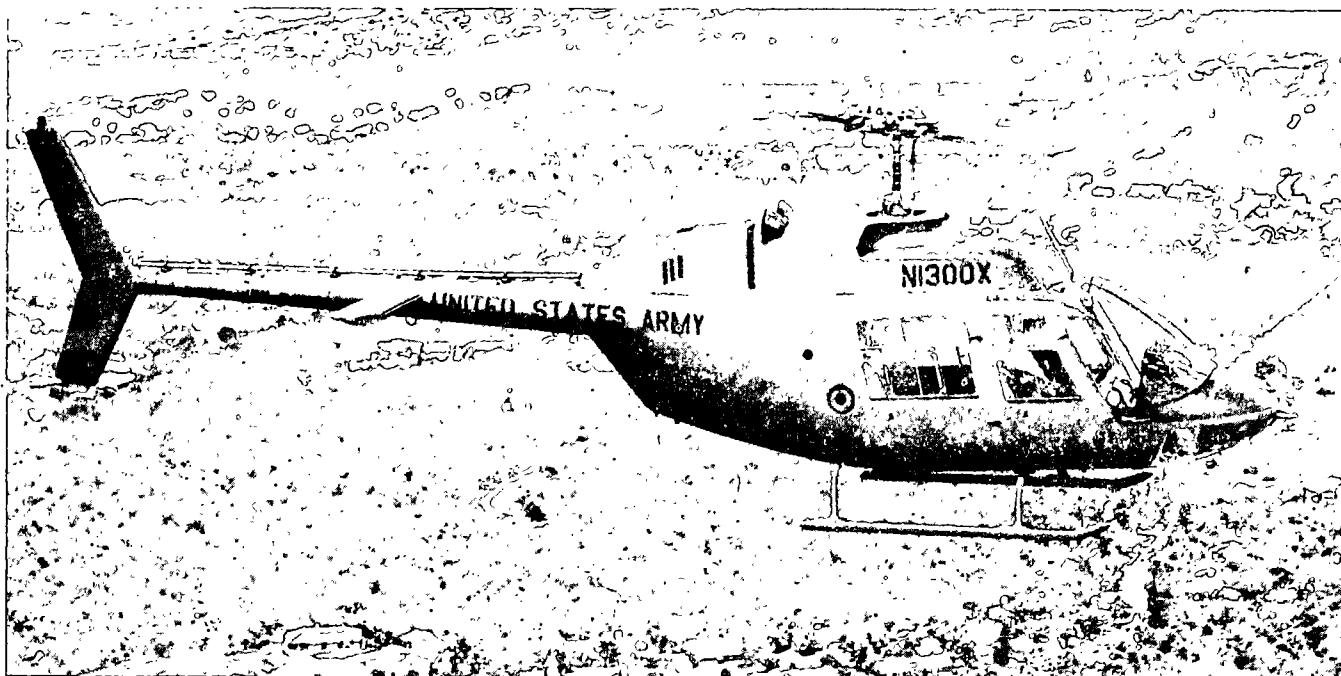


Figure 2-2. OH-58 Kiowa (observation).

changeably either the side-looking airborne radar or the infrared sensor. The OV-1 is a twin-engine

airplane capable of operating from small fields and unimproved runways.

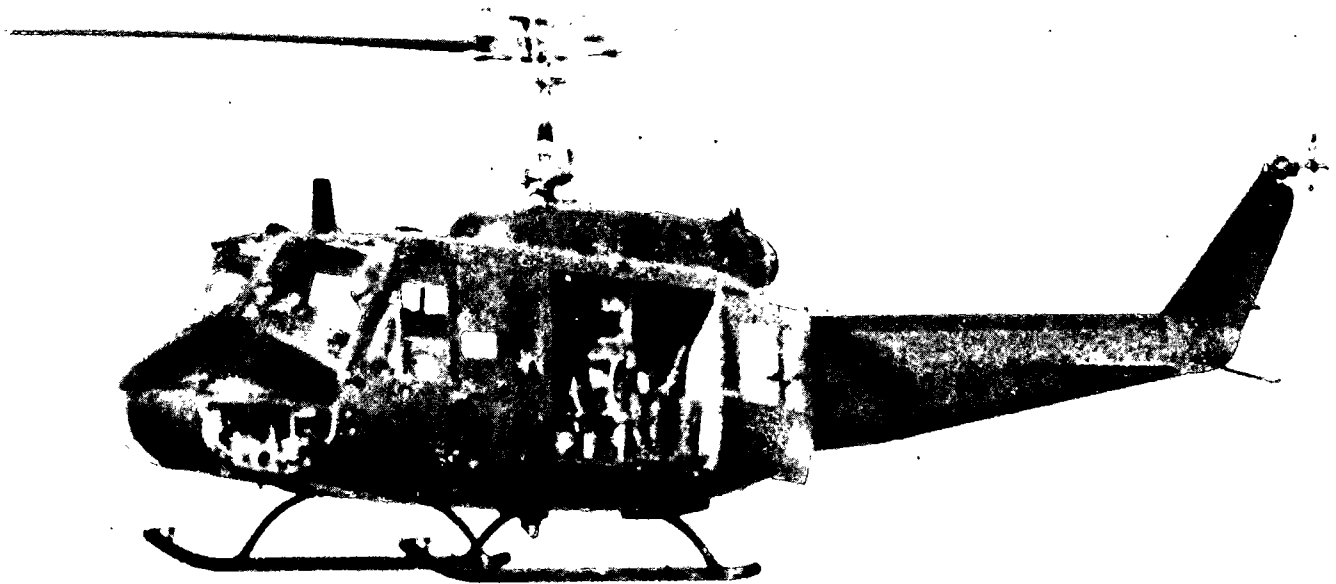


Figure 2-3. UH-1 Iroquois (utility).

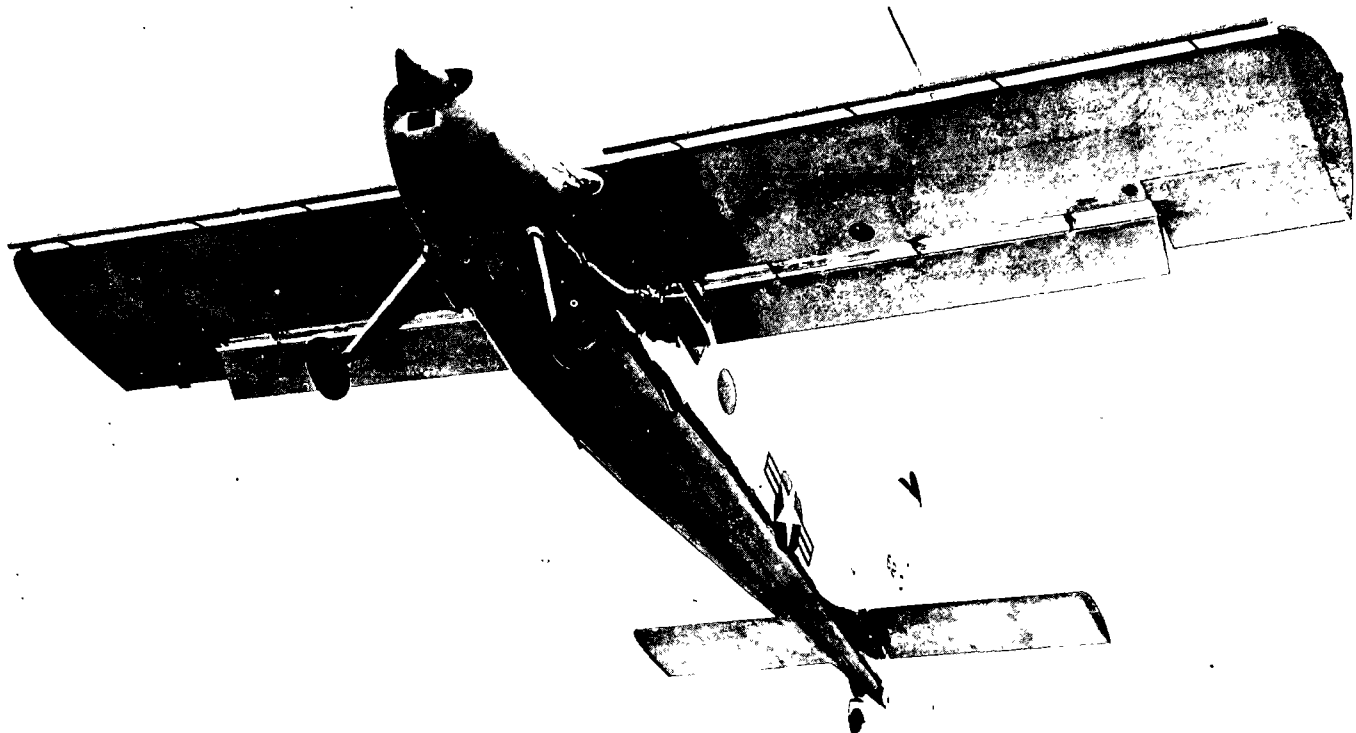


Figure 2-4. U-10 Courier (utility).



Figure 2-5. OV-1 Mohawk (medium observation).



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CHAPTER 3

AERIAL OBSERVER TECHNIQUES

3-1. General

During missions involving visual observation, the observer is primarily concerned with detection, identification, location, and reporting. Since the observer may be hampered by maneuvers used to reduce aircraft vulnerability (evasive maneuvers), he must devote maximum ability and effort to visually observe the terrain in the time available. Observation techniques will vary with the mission and the terrain.

a. Detection. Detection requires determination that an object or activity exists. Factors influencing the detection capability are terrain, concealment, light, altitude, object movement, airspeed (length of time the object is viewed), and visibility, as well as the deception practiced by the enemy.

b. Identification. Major factors in reporting an object are description, strength, and disposition. It is desirable that the observer be able to classify objects as either friendly or enemy and to discriminate among the types of objects observed. However, observers will not always be able to classify an activity as friendly or enemy. In such cases, the observer must be able to describe the activity in detail; the requester can then add this information to his knowledge of the area and information from other sources. This collective data provides means by which the identification of the object can be determined.

c. Location. The exact location of detected and identified objects is essential to aerial observer missions. Depending upon the nature of the object, the observer may locate the center of mass and/or the boundaries of the entire area encompassed.

d. Reporting. For reporting procedures, see chapter 4.

3-2. Visual Observation Techniques

There are four areas in which observation techniques may be directly applied: visual search, object recognition, graphic orientation, and object location.

3-3. Visual Search

a. General. Visual search is the systematic visual coverage of a given area so that all parts of the area have passed within visibility.

(1) Visual search is the hardest part of the observer's task. First, the observer may go through the motions of searching for an object without knowing that he is not completely or systematically covering the ground; and second, the observer is placed in a situation which taxes the limits of human visual observation.

(2) The purpose of visual search is to detect objects on the ground. The objects of interest are often the fleeting and transient types, ranging in size from a foot soldier with a hand-held weapon to the largest tactical missile and launcher or armor formation. Within the limits of tactical deployment, these objects may be located anywhere in the search area.

b. Capabilities and Limitations of Visual Search. The ability of an aerial observer to effectively search a given area depends upon several factors. In addition to the limitations of the human eye itself, the most important of these factors are—

(1) *Observation altitude.*

(a) The higher the altitude at which the aircraft operates, the greater the amount of terrain available to the observer for inspection. The distance that can be seen from an aircraft increases as the altitude increases. For example, at an altitude of 250 feet, the horizon line for an observer is found to be at a distance of about 30 kilometers. At 500 feet, or double the altitude, the horizon line is extended to a distance of about 47 kilometers. The observer may not sight even the largest objects at these extreme distances.

(b) Search distance may refer to either slant range or ground distance. In figure 3-1, A is a point on the ground track of the aircraft; B is the position of the aircraft at that moment, or the air point; C indicates the object. Then BC is slant range or search distance to the object and AC is ground distance or search distance to the object from the aircraft ground track. Slant range varies with altitude because it is the ob-

server's line of sight; ground distance does not. It is the ground distance which is used to locate an object on the map. When considering the detectability of objects, it is the slant range rather than the ground distance to the object which determines whether the object is capable of being seen. At altitudes above 2,000 feet, and for objects located near the ground track, altitude and slant range tend to become equivalent. At low altitudes, below 200 feet, and for objects located approximately 500 meters from the ground track, slant range and ground distance tend to become equivalent. While more terrain can be seen at high altitudes, a better visual coverage of the area adjacent to the ground track of the aircraft is possible at low altitudes. As a general rule, the distance of effective coverage at low altitude in visual search is approximately 1,000 meters on either side of the aircraft. However, the figure is dependent upon the condition of the terrain over which the search is made.

(2) *Speed of the observation aircraft.*

(a) The speed of visual observation aircraft is expected to range from 0 to approximately 300 knots. The upper limits of this range will not be useful in human aerial observation, but will be used instead to reduce the vulnerability of the observation aircraft. For example, at an altitude of 200 feet or below, and flying at 100 knots, the aircraft is traveling over approximately 50 meters of terrain every second. This means that the observer has available for inspec-

tion, every second, a strip of terrain 50 meters by 1,000 meters.

(b) Aircraft speed, so far as it concerns the observer, is the rate at which the terrain passes by the aircraft. If aircraft speed is held constant and the altitude is increased, the apparent rate of movement of the ground object is decreased. Conversely, as the altitude of the aircraft is decreased, the apparent movement of the ground object increases. An analogous situation would be an observer traveling at constant speed in an automobile. Objects close to the highway appear as fleeting sightings, while those at a distance seem to move more slowly.

(3) *Terrain conditions.*

(a) The amount of area that can be covered effectively in visual search is largely dependent on the type of terrain. For example, searching over dense jungle growth does not permit the degree of visual contact with the terrain that is afforded over barren wastes such as the arctic or desert regions. Consequently, the amount of search area covered in a given time would be greatly reduced.

(c) The types of terrain which permit objects to be sighted more easily are roads; open, sandy areas; or fields. Because they are easier to cover visually, aerial observers often concentrate their attention upon open areas. However, it is possible to sight down through tree stands and through the adjacent low-lying shrubs and bushes. From the air, objects are rarely seen sil-

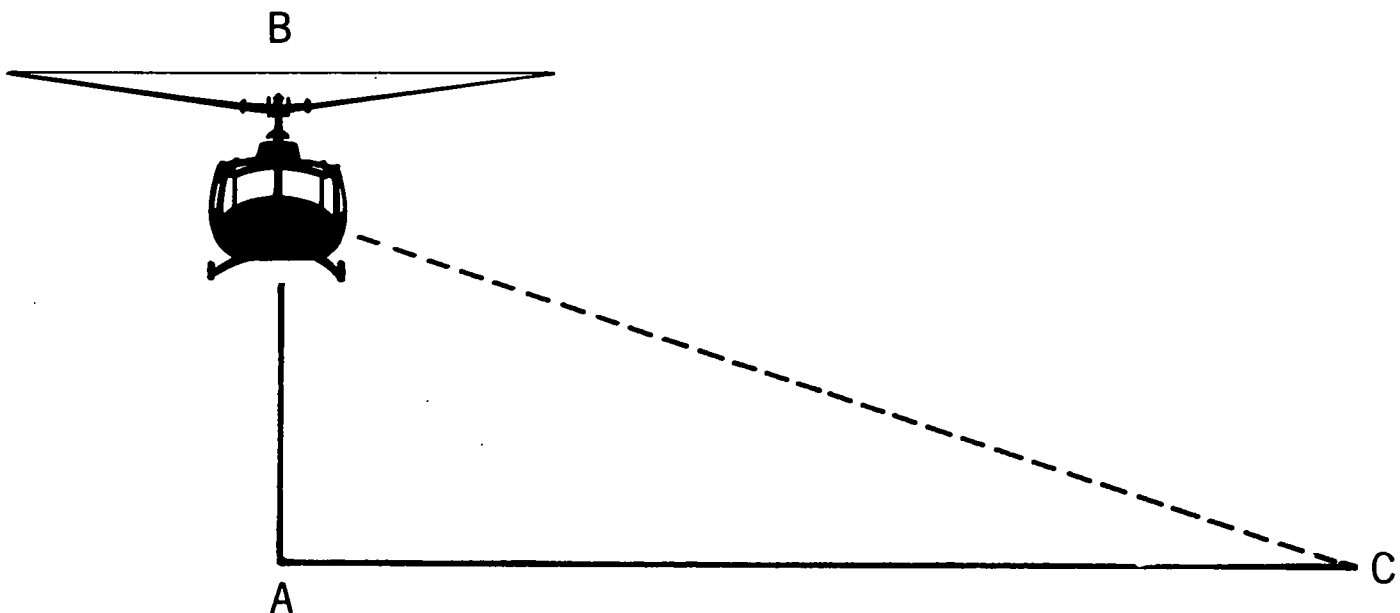


Figure 3-1. Diagram of search distance.

houetted against the sky; they normally do not stand out from their background. Many military objects with their OD paint provide poor contrast for visibility.

(c) Terrain conditions often mask the object in such a way that it is exposed to aerial view for only a very brief period. This is particularly true in hilly or mountainous regions. Basically, when the terrain is mountainous or hilly or covered with moderate to sparse vegetation, the aerial observer can effectively cover an area of about 500 meters from the ground track of the aircraft. In open terrain, his search depth can be extended to 1,000 meters.

(d) Natural cover and concealment often make detection of objects a difficult task. Visual detection of objects in areas such as triple canopy jungles or inundated areas covered with shrubs and bushes is possible only by association of enemy activity indicators. These indicators include smoke, battlefield noises, trails leading into the area, etc. Continued surveillance of an area will assist the observer in detecting clues indicative of enemy activity.

c. *Search Sectors.* Visual search is normally conducted from only one side of the aircraft at a time. The entire area on either side of the aircraft is divided into two major sectors—the nonobservation sector and the observation work sector (fig 3-2). The *nonobservation sector* is the area to the immediate front or rear of the aircraft where the observer's field of vision is restricted by the physical configuration of the aircraft. The *observation work sector* is that portion of the observer's field of vision to which his search activity is confined. This sector may include the entire area to the left or right of the aircraft, excluding the nonobservation sectors. The observation work sector is further subdivided into an orientation sector and a search sector.

(1) *Orientation sector.* The orientation sector is the forward portion of the observation work sector and is primarily used to locate terrain features for in-flight orientation. Preflight planning incorporating the use of prominent terrain features will allow the observer to spend a minimum of time in this sector.

(2) *Search sector.* The search sector is the rear portion of the observation work sector in which the observer systematically scans the terrain. It is on this sector that the observer centers his attention during visual search.

d. *Techniques.* Three techniques that provide systematic methods for conducting visual aerial

observation are *side scan*, *motive*, and *stationary*.

(1) *Side scan.* The side scan technique is normally applied when the aircraft is operating at an altitude of 100 feet above ground level or higher. Below an altitude of 500 feet, the observer's line of sight is directed toward the horizon. Above 500 feet, the line of sight is directed downward. Over most terrain the observer systematically (fig 3-3)—

(a) Looks out toward the horizon approximately 1,000 meters and searches in toward the aircraft (step A).

(b) Looks out to one-half the distance (500 meters) and searches in toward the aircraft (step B).

(c) Looks out to one-fourth the distance (250 meters) and searches in toward the aircraft (step C).

(d) Repeats the above process.

Note. The rapidity at which the above steps are repeated depends on the speed of the aircraft. When an object is sighted the observer should record the information as quickly as possible and then continue his systematic search.

(2) *Motive.* The motive technique of aerial visual search is applied when the aircraft is operating at an altitude of below 100 feet above ground level and at an airspeed of 10 knots or faster (fig 3-4).

(a) In this technique the observation work sector is subdivided into two smaller sectors—

1. *Acquisition sector.* The acquisition sector is the forward 45° area of the observation work sector. This is the observer's primary area of search in the motive technique.

2. *Recognition sector.* The recognition sector is the remainder of the observation work sector to the rear of the acquisition sector. When an object is sighted in the acquisition sector, the sighting will be confirmed and identified in the recognition sector.

(b) In using the motive technique, the observer—

1. Looks forward of the aircraft and through the center of the acquisition sector for obvious sightings (step A).

(a) Over open terrain the observer should look as far forward as necessary to detect enemy direct fire threats to the aircraft.

(b) Over heavy vegetated terrain the observer should look as far forward as he can detect the ground through the vegetation.

2. Scans left to right through the ac-

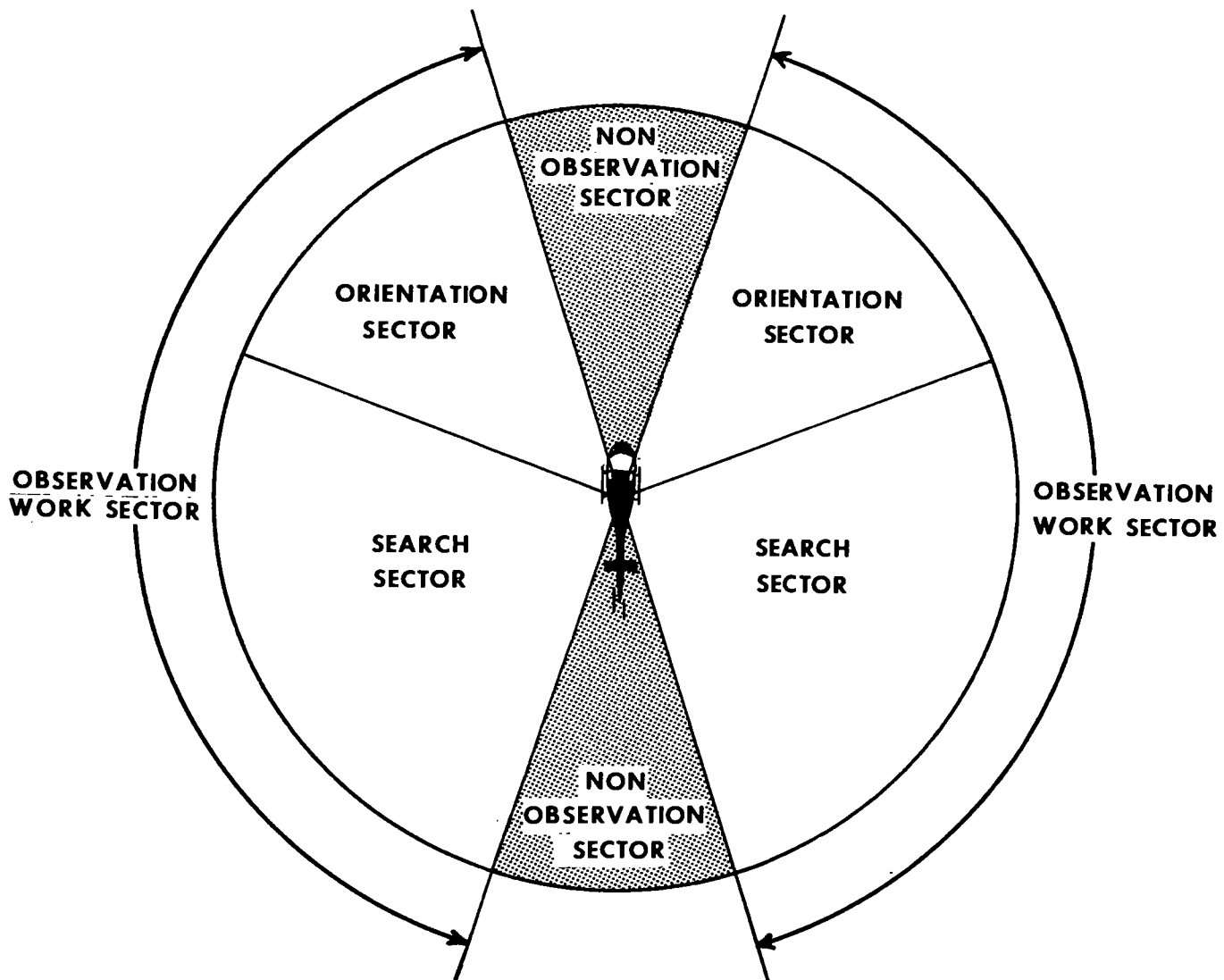


Figure 3-2. Observation sectors.

quisition sector, gradually working back toward the aircraft (step B).

3. Repeats steps A and B.

(3) *Stationary.* The stationary technique of visual search is used only with helicopters. It is applied with the aircraft at a hover in a concealed position. The observer may use binoculars or ranging devices to aid in his search. Although the aviator may assist the observer by observing in close proximity to the helicopter, the aviator's primary tasks are controlling the helicopter and maintaining the concealed position.

(a) *Sectors of search.* There are no clearly defined sectors of search in the stationary technique. However, if the search area is large, it may be divided into smaller sections (fig 3-5).

(b) When using the stationary technique the observer—

1. Makes a quick overall search for obvious sightings, unnatural colors, outlines, or movements (step A).

2. Begins a left to right scan to his immediate front, searching an area approximately 50 meters in depth (step B).

3. Continues to scan outward from the aircraft, increasing the depth of the search area by overlapping 50 meter intervals (step C).

4. Repeats step C until the entire search area has been covered.

3-4. Object Recognition

Regardless of the observation technique employed, there are certain factors which affect the observer's ability to detect and identify objects.

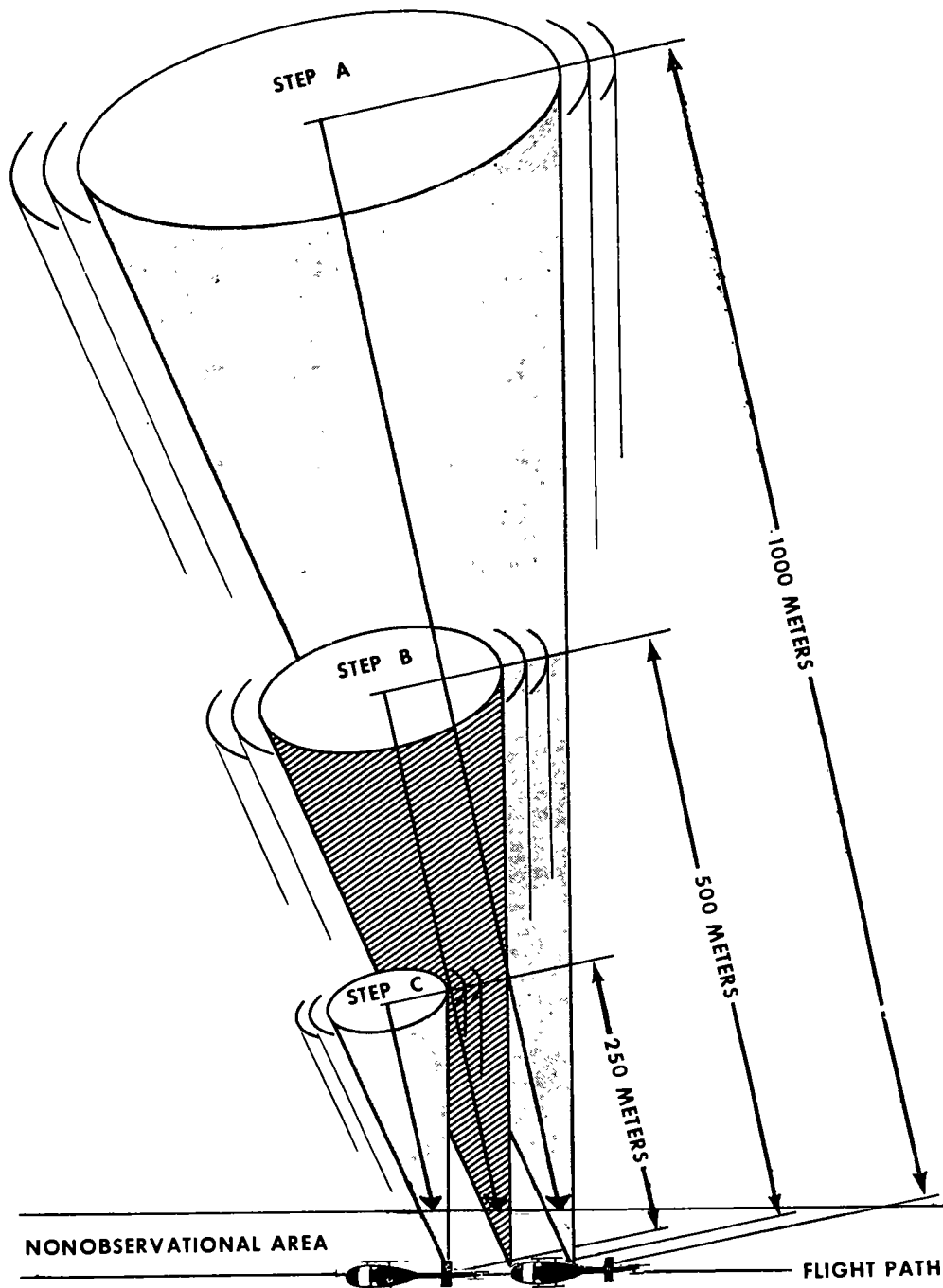


Figure 3-3. Side scan search technique.

These factors determine the accuracy and completeness with which visual aerial observation missions can be performed. They must be thoroughly understood by all persons concerned with the conduct of aerial observation and with the training of aerial observers. For a detailed discussion of recognition factors see FM 5-20.

a. Experience. The amount of experience an observer has had in actually observing from an aircraft will largely determine his effectiveness.

Therefore, realistic training flights should be an important part of aerial observer training.

b. Distance. As the distance between the observer and an object increases, the ability of the human eye to recognize distinctive characteristics of the object decreases. Therefore, effective training must include slides and photographs of different objects at varying distances. Table 3-1 shows approximate maximum recognition distances for various items of equipment.

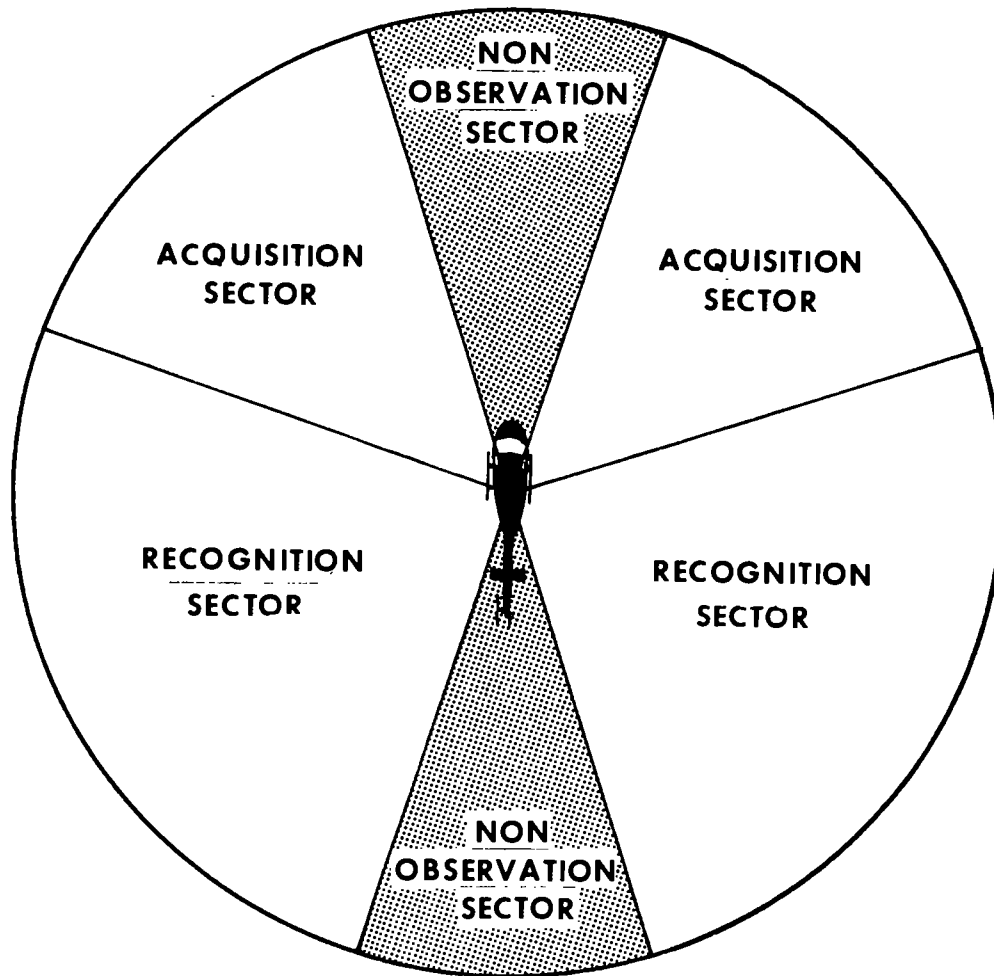


Figure 3-4. Search sectors, motive visual search technique.

Table 3-1. Approximate Recognition Distances

Object	Slant range (meters)
Gun, machine, 7.62mm	100
Launcher, rocket, 3.5-inch	175
Mortar, 81mm	200
Gun, machine, cal .50	225
Personnel	300
Mortar, 4.2-inch	300
Rifle, recoilless, 106mm	300
Howitzer, 105mm, towed	600
Truck, utility, ¼-ton, 4 x 4	600
Howitzer, 155mm, towed	900
Truck, cargo, ¾-ton, 4 x 4	900
Howitzer, self-propelled, full-track, 155mm	925
Truck, cargo, 2½-ton, 6 x 6	925
Tank, combat, full-track, M-60	925

c. Position. The position of an object in relation to its surroundings often aids in detection and recognition. For example, a long object on a railroad track is assumed to be a train; objects on a river parallel to its banks are assumed to be boats or barges.

d. Shape. The general shape or outline of an object is recognizable from distances at which its detailed composition cannot be determined. Trucks, guns, tanks, and other items of military equipment all have distinctive shapes which make them easily recognizable at considerable distances.

e. Shadow. An object's shadow may be even more revealing to a trained aerial observer than the object itself. Items such as factory chimneys, utility poles, vehicles, bridges, and tents all have distinctive shadows which are easily recognizable from the air.

f. Texture. Texture is the ability of an object to reflect, absorb, and diffuse light. Rough surfaces such as grassy fields reflect little light and cast shadows on themselves; consequently, they appear dark to the eye. Smooth surfaces such as airstrips or roofs reflect more light and appear lighter to the eye than similarly colored surroundings. Extremely smooth surfaces such as

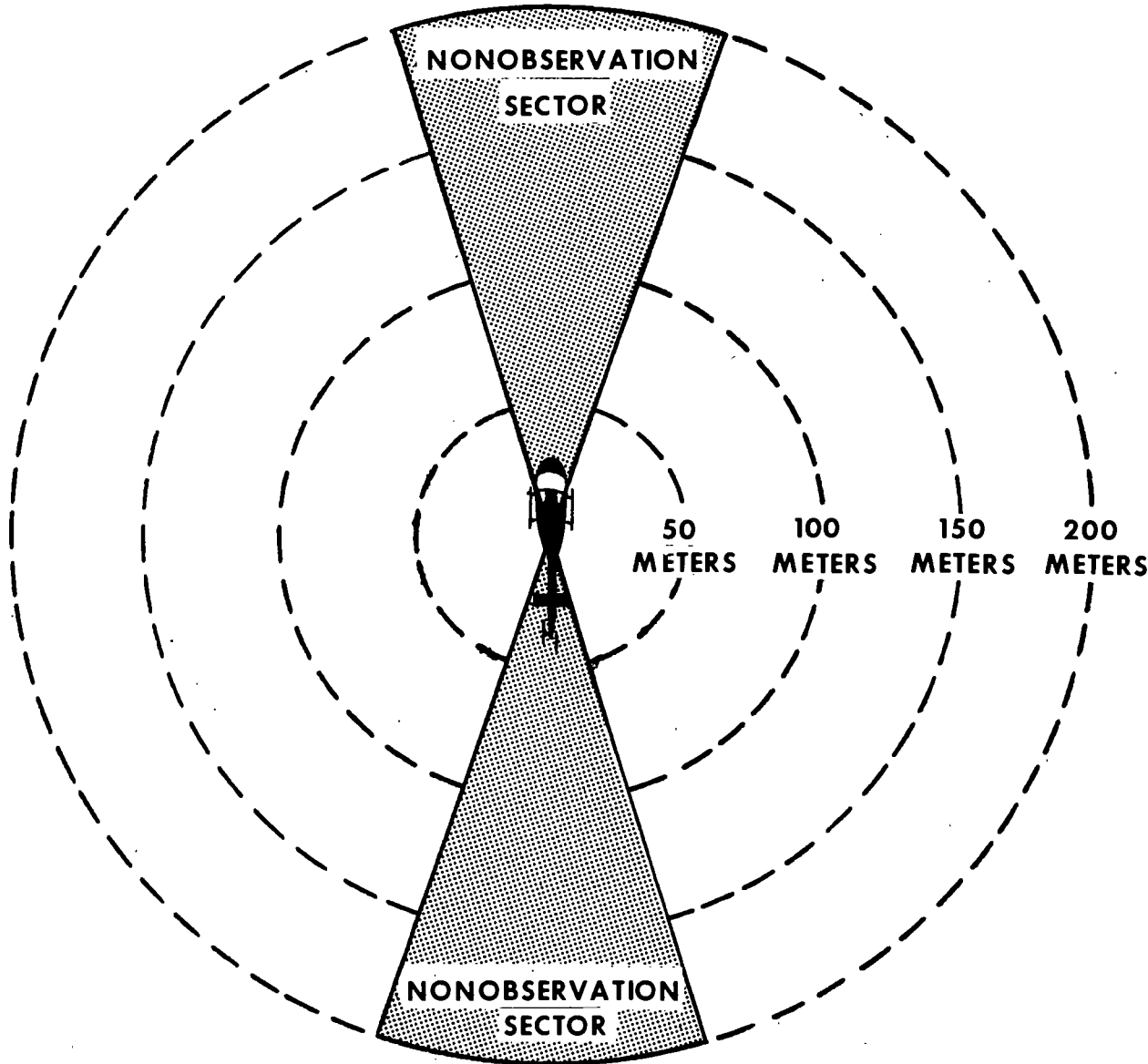


Figure 3-5. Stationary search technique.

glass or metal may produce shine in direct sunlight and are easily detected by aerial observers.

g. Color. Contrast between the color of an object and that of its background makes the object more easily detectable to aerial observation. Lighter shades of a given color will be more likely to attract an observer's attention than darker, less brilliant shades.

h. Movement. Movement of an object, even when all other recognition factors have been eliminated, will usually be easily detectable from the air. Good peripheral vision is a decided asset to an aerial observer in detecting movement.

i. Observer Response Time. Speed of the aircraft and the number of objects detected will

determine the importance of observer response time. Observers should be trained to respond instantly when an object is sighted. Use of abbreviations in recording sightings will enable the observer to respond more efficiently (table 3-2 contains a partial list of military items and their common abbreviations).

Table 3-2. Military Items and Abbreviations

Nomenclature	Abbreviated name
Personnel	Troops
Truck, utility, ¼-ton, 4 x 4	¼
Truck, cargo, ¾-ton, 4 x 4	¾
Truck, cargo, 2½-ton, 6 x 6	2½
Truck, cargo, 5-ton, 6 x 6	5
Truck, commercial, 1½-ton, 4 x 2	1½
Carrier, light weapon, infantry, ½-ton, 4 x 4, M-274	Mule

Table 3-2. Military Items and Abbreviations

Nomenclature	Abbreviated name
Trailer, ¼-ton, 2-wheel -----	¼ T
Trailer, ¾-ton, 2-wheel -----	¾ T
Gun, machine, 7.62mm -----	7.62
Gun, machine, cal .50 -----	50
Gun, self-propelled, full-track, 175mm -----	175 SP
Mortar, 4.2-inch -----	4.2
Mortar, 81mm -----	81
Launcher, rocket, 3.5-inch -----	3.5
Howitzer, 105mm -----	105
Howitzer, 155mm -----	155
Howitzer, self-propelled, full-track 105mm -----	105 SP
Howitzer, self-propelled, full-track, 155mm -----	155 SP
Launcher, rocket, multiple, 4.5-inch -----	4.5
Rifle, recoilless, 106mm -----	106
Carrier, personnel, full-track, armored, M-113 -----	M-113 APC
Truck tractor, semitrailer, M-15 -----	M-15
Tank, combat, full-track, MBT-M-60 -----	M-60
Tent, 2-man -----	Pup tent

j. Uniqueness of Objects. Uniqueness by type of many objects makes specific identification possible, depending upon the training an observer has received. The more extensively a training program employs recognition aids such as scale models, recognition charts, and photographs, the greater will be the observer's ability to identify objects specifically by type (appendix B contains practical guides for the presentation of object recognition instruction and for the preparation of training aids).

3-5. Graphic Orientation

a. Graphic orientation is the process whereby the observer becomes oriented to the terrain so that he knows his position relative to some graphic reference such as a map, chart, or aerial photograph. The orientation sector (fig 3-2) is used for graphic orientation. Using key terrain fea-

tures (normally preplanned), the observer orients his map or other graphic reference so that he can rapidly shift from points on his map to corresponding points on the ground, and vice versa.

b. Graphic orientation should be emphasized in aerial observer training. The observer must learn to recognize a terrain feature on his map, orient himself in relation to that terrain feature, and locate objects on the ground with reference to the surrounding terrain. Appendix B contains practical guides for the presentation of graphic orientation instruction and for the preparation of training aids.

3-6. Object Location

a. Object location is the transposition of a sighted object on the ground to a map or other graphic reference. The observer must be trained to rapidly and accurately pinpoint object positions on his map. Once an object has been sighted and its position fixed on the observer's map, the sighting must be rapidly recorded and reported. Reference numbers are assigned to sighted objects, and the information is normally reported by verbal means such as radio or recording devices.

b. Training in object location combines all previous training. The observer must be able to—

(1) See and recognize an object (search and recognition training).

(2) Orient the sighted object with reference to the surrounding terrain (graphic orientation training).

(3) Locate the sighted object on a map or chart (object location training).

c. Appendix B contains practical guides for the presentation of object location instruction and for the preparation of training aids.

CHAPTER 4

AERIAL OBSERVATION PLANNING AND OPERATIONS

Section I. GENERAL

4-1. Concept of Employment

Aerial observation missions will be flown mainly in support of infantry, armored, or artillery units. The specific mission to be flown (surveillance, reconnaissance, or special) will vary with the intelligence requirements. During a single mission or flight, the aviator-observer team may be called upon to change from one mission to another or to perform more than one type of mission. For example, an aviator-observer team on a surveillance mission may be diverted to confirm a suspected object, thus changing the mission to one of reconnaissance; or the aviator-observer team on a reconnaissance mission may be told to perform a camouflage inspection, which changes the mission to *special*.

4-2. Command and Staff Responsibilities for Aerial Observation

a. Intelligence Officer, G2(S2). The G2(S2) has overall staff responsibility for the collection, production, and dissemination of intelligence, including that gathered from the air.

b. G2(S2) Air. The G2(S2) Air is responsible for the overall planning and coordination of the aerial observation effort within his command.

c. Commanding Officers, Supported Ground Forces. Commanders of supported ground forces are responsible for furnishing qualified aerial observers. Through coordination with supporting aviation units, the ground force commander may arrange for the training of personnel as aerial observers.

d. Army Aviation Staff Officer. The Army aviation staff officer exercises staff supervision over technical and flight aspects of administration,

training, safety, and operation of Army aviation units and plans and supervises the employment of aviation in combat and combat support units. In units not authorized an aviation staff officer, the senior officer of supporting aviation elements performs aviation staff duties.

e. Commanding Officer, Army Aviation Unit. The commanding officer of an aviation unit is responsible for the employment of available organic means in the execution of aviation missions assigned to his command and for the training of aerial observers. The senior commander of a supporting aviation element has the responsibility of providing aviation staff support to the supported unit. This is usually accomplished through a liaison officer to the supported unit.

f. Operations Officer, Army Aviation Unit. The operations officer of the aviation unit is responsible to the unit commander for supervising the aviation unit operations section and the processing, assigning, and planning of specific flight missions.

g. Aviator-Observer Teams. Aviator-observer teams performing aerial observation must be capable of providing timely response to the requirements of the combat intelligence system and complete and accurate information in the degree of detail requested. Aviator-observer teams must—

- (1) Have a thorough understanding of the mission.
- (2) Plan the mission.
- (3) Supervise preparation of the equipment.
- (4) Prepare and file the flight plan for the mission.
- (5) Execute the mission.
- (6) Prepare mission data for debriefing.

Section II. AERIAL OBSERVATION MISSION REQUEST AND ASSIGNMENT PROCEDURES

4-3. General

Aerial observation mission requirements may originate at any level of command. According

to the time available, they are classified as either *preplanned* or *immediate* mission requirements.

a. Preplanned. Preplanned mission require-

ments are anticipated observation requirements. Unit standing operation procedures (SOP) will establish the cutoff time for the submission of preplanned mission requirements.

b. Immediate. Immediate mission requirements are unforeseen observation requirements. Normally, a portion of the observation air effort is allocated to meet immediate observation requirements as they arise. In the event additional assets are not available, preplanned missions will be adjusted to accomplish the higher priority mission.

4-4. Mission Request Procedures

All aerial observation mission requests are processed through intelligence channels.

a. Preplanned Aerial Observation. Any intelligence communications method (i.e., radio, wire, courier, etc.) may be used for requesting preplanned missions so long as the request arrives at the action headquarters prior to cutoff time established by SOP. All intermediate headquarters will take the necessary action to approve, disapprove, or modify requested preplanned missions.

b. Immediate Aerial Observation. Immediate mission requests from subordinate elements that have a tactical air control party (TACP) attached are transmitted over the Air Force immediate air request net directly from the requesting unit's TACP, bypassing any intermediate headquarters, to the direct air support center (DASC). The corps G2 Air, who is located at the tactical air support element (TASE) of the corps tactical operations center (CTOC), receives a copy of the request from the DASC. Units that do not have a TACP will forward requests by the most expeditious means to the next higher headquarters, until they arrive at a headquarters with a TACP where the requests are inserted into the Air Force immediate air request net. The battalion, brigade, and division TACP all monitor the Air Force immediate air request net. When a request is submitted over the net, intermediate headquarters will—

(1) Monitor and acknowledge receipt of the transmission.

(2) Remain silent after acknowledging receipt of the transmission, thereby signifying approval of the request.

(3) Enter the net to disapprove the requested mission.

(4) Enter the net to modify the requested mission.

4-5. Mission Assignment Procedures

The G2(S2) Air has overall staff responsibility for planning and coordinating the aerial observation effort of the command. Upon receiving an aerial observation request, the G2(S2) Air will, in the name of the commander, approve, disapprove, modify if necessary, and/or assign the mission to an aviation element for execution. For approved missions, the G2(S2) Air will determine the type of mission (reconnaissance, surveillance, or special) to be flown and the method of observation, visual or by electronic or photographic means, to be used to conduct the mission. For missions using electronic or photographic means, the G2(S2) Air may specify the type sensor to be used (photographic, radar, infrared, etc.). For a discussion of aerial surveillance and reconnaissance by electronic or photographic means, see FM 30-20. Preplanned missions will be assigned to units in the aerial surveillance and reconnaissance plan. Immediate missions will be assigned to units through normal command channels using any rapid means of communications available.

4-6. Briefing

To insure a thorough understanding of assigned missions, the aviator-observer team will receive general and preflight briefings.

a. A general briefing is given daily to all aviator-observer teams. Pertinent information relative to tactical operations for the next 24 hours is presented. This briefing aids in reducing the amount of information that must be presented at the preflight briefing.

b. The preflight briefing, which is conducted in conjunction with the assignment of the mission, includes all information relative to the conduct of the mission. The G2(S2) Air (or his representative) or an intelligence representative of the supported unit conducts the intelligence portion of the briefing. The flight operations officer conducts that portion of the briefing pertaining to aviation matters.

c. The general and preflight briefings may be conducted using the format of a 5-paragraph operations order.

Section III. MISSION PLANNING AND DUTIES OF THE AVIATOR-OBSERVER TEAM

4-7. General

After receiving an aerial observation mission assignment and the general and preflight briefings, the aviator-observer team plans the mission. This is the preflight planning phase, and consists of four steps:

- a. Map and aerial photograph selection.
- b. Terrain evaluation.
- c. Flight planning.
- d. Crew coordination.

4-8. Map and Aerial Photograph Selection

Only those maps and photographs necessary for the conduct of the mission should be selected and carried by the aviator-observer team. These should be the most current available and of a scale that will facilitate navigation by the aviator and accurate locating and recording of information by the observer. For navigation, medium scale maps (1:100,000) will assist the aviator in flying from the forward assembly area or airstrip to the mission area. For observation, tactical scale maps (1:50,000) will aid the observer in accurately identifying and locating prominent terrain features by coordinates. The scale of an aerial photograph should not be smaller than 1:20,000 and, depending upon the detail desired, may be as large as 1:5,000.

4-9. Terrain Evaluation

Preliminary analysis of the terrain to be covered is made from: maps and photos; past experience of the aviator and observer and their knowledge of the situation and the enemy; viewpoints of other personnel with experience in the area; and recorded information from previous missions. Areas known to contain enemy positions or activities are marked on the map or photo. Key terrain feature, woods, and defilade areas are marked for close observation as possible locations for enemy strongpoints, field artillery positions, assembly areas, command posts, supply dumps, etc. Guiding factors in determining probable locations of enemy positions or activities in the areas of influence and interest include the following:

- a. Strongpoints and observation posts can be expected in any area where the terrain offers a decisive advantage to the holder.
- b. Field artillery positions normally are located in defilade.

c. Assembly areas usually are in wooded areas or other areas offering cover and concealment.

d. Supply installations have accessible road nets and, when possible, are out of range of artillery.

e. Roadblocks can be expected at narrow points along the routes of advance where bypass is difficult or impossible.

f. Command posts normally are located near good road nets, in defilade, and in areas containing good natural concealment. Presence of vehicles, troop shelters, and a concentration of communication antennas usually indicates the location of a command installation.

4-10. Flight Planning

In flight planning, the aviator-observer team conducts a detailed map and aerial photograph study (para 4-8); selects primary and alternate flight routes, altitudes, and checkpoints; memorizes prominent terrain features; and prepares notes or a checklist as necessary to assist in accurate orientation and location. In addition, the following factors must be considered:

a. *Type Mission.* The flightpath must coincide with the assigned task; i.e., if the mission is an area search reconnaissance, the flightplan must permit the observer to view and search the entire designated area at frequent intervals to insure immediate detection and location of enemy activities and complete coverage of the assigned mission area.

b. *Time Allocated.* The briefing officer specifies the time allocated for each mission or the time that the mission information is required. This time element may be necessary to insure maximum aircraft utilization and aviation support and/or to insure that collected intelligence information is disseminated while still valid. The time element may require that the aviator fly the shortest flightpath, giving the observer only a one-pass opportunity to observe preselected areas.

c. *Methods of Reporting.* Radio is the primary means of reporting information as it is obtained. Frequencies, call signs, codes, reporting times, and authentication procedures must be verified prior to flight. Appendix C lists the standard form of message for an in-flight report. In the event of radio failure or denial of radio communications through enemy electronic countermeasures, alternate means may be used such

as message drops or landing to contact personnel of friendly units. A debriefing (para 4-15) will be conducted upon completion of all missions.

d. Flight Routes. The flight route is the flight-path from the tactical landing area to, through, and over the forward friendly positions. Coordination must be established between the aviator-observer teams and aviation operations sections, flight coordination centers (FCC), or flight operations centers (FOC) to avoid the hazards of friendly mortar and artillery fires, nuclear weapons, and air defenses. The flight routes must be planned to insure complete coverage of the mission area with minimum exposure of the aviator-observer team to flight hazards and enemy countermeasures.

e. Altitude. The mission requirements will dictate the mission altitude. Enemy air defense capabilities also influence both the mission altitude and the altitude flown to and from the observation area. Friendly artillery fires must be considered when planning flight altitudes. See FM 30-20 for additional altitude considerations when employing observation by electronic or photographic means.

(1) *Mid- and high-intensity warfare.* The encounter of a sophisticated enemy air defense system can be anticipated. Radar guided and heat seeking anti-aircraft weapons will dictate nap-of-the-earth flights on all air observation missions in proximity to enemy units.

(2) *Low intensity operations.* Enemy small arms fire and small caliber automatic weapons will present the largest threat to aircraft in low intensity operations. Based on these considerations, observation missions normally will be flown at altitudes which afford protection from hostile small arms fire. Here again, the mission requirements will dictate the mission altitude while in the observation area.

f. Direction of Observation. The aviator-observer team must consider the approach for an observational pass to insure that the enemy, sun, shadows, terrain features, etc., do not hinder, but rather enhance, the observer's opportunity to detect the enemy.

4-11. Crew Coordination

Crew coordination consists of an intercrew briefing, preparation of checklists, and a thorough equipment check. This equipment check includes the aircraft preflight inspection and check, and inspection of any other equipment that may be

necessary for the mission; i.e., maps, cameras, sensors, binoculars, flares, etc.

4-12. Duties of the Aviator-Observer Team

In addition to the preflight planning, the aviator-observer team must fly the mission and detect, identify, estimate the size, and determine the location, disposition, and activities of objects. As required by the mission, the team must rapidly record or report all significant observations while the aircraft is operating at varying attitudes, groundspeeds, and altitudes. Emphasis is placed on speed, accuracy, and completeness of information.

a. Detection. Objects must be detected under conditions of excellent concealment and great dispersion, to include temporary or highly mobile objects.

b. Identification. Objects must be accurately identified and promptly reported to permit valid assessment of the situation and application of appropriate countermeasures.

c. Strength Estimation. Accurate reports of strength or size provide additional information about the capabilities and composition of enemy forces. Objects should be reported by actual count or estimated number. Dispersion on the battlefield will result in an increased number of object groups; however, the elevated position of the aerial observer will enhance his capability to estimate the strength of these groups.

d. Object Location. Exact locations of objects are essential, particularly if the object is to be engaged by unobserved fire.

e. Disposition and Activity. Accurate and complete reports on object disposition and activity provide guidance in determining enemy composition and capabilities and locations of highly mobile objects.

4-13. Recording

To provide commanders with accurate information, a systematic method of recording information observed during the flight must be used. When recording on a map or photograph, an abbreviated term may be used to identify the observed object (table 3-2). The notation may be made directly on the map or photograph at the location where the object or activity was observed. Portable recording instruments, such as tape recorders, may be used by the observer to record observed information. In special situa-

tions the observer may use a hand-held camera to photograph sighted objects.

4-14. Reporting

To provide commanders and staffs with critical information during the conduct of the mission, the aviator-observer team must be able to make reports to the requesting unit by means of radio, message drop, or prearranged signals. When circumstances permit, the aviator will land at or near the requesting unit to report pertinent information. If a report is not required while the aircraft is in the air, the debriefing officer forwards a mission report through intelligence channels to units concerned. Although an in-flight re-

port may not be required, the aviator-observer team must constantly evaluate observed information, and report any information that may be of immediate value.

4-15. Debriefing

For maximum information, the same individual should conduct both the preflight briefing and the debriefing of the aviator-observer team. Information is consolidated into two categories—mission and general information.

a. *Mission.* On debriefing, the aviator-observer team is asked questions covering all aspects of the mission assigned in the preflight briefing.

MISSION NO. 3 DATE/TIME 210600 June MAP/PHOTO Daleville Ala. 1:25000
OBSERVER Greene ORGANIZATION B Co. 20th Arm Bn
TYPE MISSION Reconnaissance TYPE AIRCRAFT OH

ITEM NO	OBJECT IDENTIFICATION	MAP/PHOTO LOCATION	OBJECT DESCRIPTION	TIME OF OBSERVATION	REMARKS
1.	APC	318670	Three APC's moving north of Hill 308.	0932	Directed artillery fire.
2.	Ho Mortar (4.2) troops	320690	One mortar dug in; four individuals digging in.	0937	

Figure 4-1. Sample debriefing format.

b. General. Any additional information obtained which was not an assigned mission task, but is of value (such as areas of enemy small arms fire) or any changes in tactical maps and weather data is general information.

4-16. Debriefing Form

Figure 4-1 shows a sample debriefing format to aid the aviator-observer team in compiling mission data to shorten the time spent in debriefing. This format may be modified as the situation requires.

CHAPTER 5

AERIAL OBSERVER TRAINING GUIDE

Section I. GENERAL

5-1. Purpose

This chapter is a guide for commanders in establishing and conducting a visual aerial observer training course.

5-2. Responsibility

Commanding officers of Army aviation units are directly responsible for the conduct, efficiency, and results of aerial observer training within their parent organizations.

5-3. Authority

a. AR 40-501 prescribes the physical requirements for observer training.

b. AR 600-106 authorizes flight status for observers.

5-4. Training Objective

The objective of observer training is to qualify selected personnel as aerial observers.

5-5. Scope

Aerial observer training will be designed to meet the needs of each branch of service concerned and will be of adequate length to fulfill the observation requirements.

a. AR 95-1 outlines the scope and minimum number of hours required for the observer training course.

b. Appendix B provides a practical guide for the presentation of basic skills instruction and the preparation of training aids.

Section III. SELECTION CRITERIA

5-6. Trainees

When selecting personnel to be trained as observers, the following should be considered:

- a. Physical profile.
- b. Diversified experience in basic branch.
- c. Desire to fly.
- d. Previous flying experience.

5-7. Instructors

Qualifications to be considered in selecting in-

structors to conduct observer training are that the individual—

- a. Is airplane and/or helicopter qualified.
- b. Is qualified in one of the branches most often requiring aerial observation missions (armor, infantry, or field artillery).
- c. Has other related specialized training, such as that required for combat intelligence, aerial photography, communications, or air-ground operations.

Section III. PLANNING

5-8. General

In planning an observer training course, Army aviation unit commanders, operations officers, and instructors must consider the—

- a. Specific training objectives.
- b. Training variables.
- c. Methods of instruction.
- d. Program of instruction.

- e. Equipment availability.

5-9. Specific Training Objectives

The training course must prepare the individual to —

- a. Detect, identify, locate, and report friendly and enemy personnel and equipment, and combat area activity.
- b. Use special equipment (photographic, electronic, and CBR).

c. Adjust the fire of indirect fire weapons from the air.

d. Plan surveillance, reconnaissance, and special observation missions (using maps and aerial photos), to include the flightpaths, altitudes, checkpoints, etc.

e. Analyze terrain conditions and report changes in terrain which do not appear on maps.

f. Report information to appropriate agencies clearly, concisely, and accurately.

g. Understand the pilot techniques of level flight and of landing the aircraft.

h. Employ communications security measures consistent with the successful completion of the mission.

i. Be able to communicate effectively in spite of enemy electronic countermeasures.

5-10. Training Variables

In any training situation, a number of variables affect the methods of training used, time allotted for training, and the program of instruction. These variables include the—

- a. Training mission.
- b. Training status of the individual and the unit.
- c. Personnel situation.
- d. Time available for training.
- e. Training areas and facilities.
- f. Weather and climatic conditions.
- g. Status of equipment.
- h. Special subjects to be stressed.

5-11. Methods of Instruction

To insure maximum effectiveness and uniformity of instruction, the commander must determine the best methods for utilizing instructors, presenting subject material, and conducting the training course. Specific training methods are given in FM 21-5.

a. It is desirable to use the same instructors throughout the course (during the individual and team phases of training).

b. Subject material should be presented in conferences, demonstrations, or practical exercises. Lectures should be avoided. The maximum number of field exercises should be included to give

the student practical application of his classroom training.

c. The training course is divided into two phases—individual and team.

(1) *Individual*. Individual training encompasses the necessary hours of ground and flight subjects to prepare the individual to work as a member of the aviator-observer team.

(2) *Team*. Team training establishes the aviator-observer team and qualifies the individual as an observer.

d. Classroom training should be designed to teach effective aerial observation techniques and procedures for actual flight, with emphasis on speed, accuracy, and completeness.

(1) Flight training is scheduled immediately after visual search, recognition, graphic orientation, and object location training to better associate classroom instruction with practical application.

(2) Flight training should begin with a brief orientation for the students, as a group, stressing the capabilities of the aircraft to operate in normal, marginal, and emergency operational situations. This should be followed immediately with a demonstration at the airfield depicting normal landings and takeoffs, simulated short field landings and maximum performance takeoffs, simulated takeoffs over barriers, power-off landings simulating marginal and emergency situations, and low altitude 360° and 720° steep turns demonstrating the stability and controllability of the aircraft. The students should be encouraged to ask questions while observing the demonstration.

(3) After the orientation and demonstration, the student aerial observers should be given an orientation ride of approximately 30 minutes. The aircraft used should be of the same type as those to be used later on in the training program. The aviators conducting these rides should be the instructors for the course and must insure that this ride does not include any violent maneuvers. The best flight altitude is 1,000 feet, and over an area readily recognizable by the student. The student should be encouraged to discuss his impressions of various sightings.

(4) Upon completion of the introductory ground training, an average student requires a minimum of 15 training flights before he may be considered to have marginal training as an aerial observer. Normally, 25 training flights are required to qualify a student as an effective aerial observer. Therefore, the 20 flying hours included

in the aerial observer program of instruction given in AR 95-1 can best be utilized as follows:

- (a) One 30-minute orientation ride;
- (b) Five 30-minute training flights (at the beginning of the flying portion of the course);

(c) Seven 1-hour training flights; and

(d) The remaining 10 hours used for training flights of varied duration but not to exceed 2 hours at any one time. See ASubjScd 1-8 for detailed guidance on aerial observer training.



APPENDIX A

REFERENCES

1. Army Regulations (AR)

40-501	Standards of Medical Fitness.
95-1	Army Aviation—General Provisions and Flight Regulations.
310-25	Dictionary of United States Army Terms (Short Title: AD).
310-50	Authorized Abbreviations and Brevity Codes.
350-1	Army Training.
600-106	Aeronautical Designations and Flying Status for Army Personnel.

2. Field Manuals (FM)

1-15	Aviation Company, Battalion, Group, and Brigade.
1-40	Helicopter Gunnery.
1-100	Army Aviation Utilization.
3-12	Operational Aspects of Radiological Defense.
5-20	Camouflage.
5-34	Engineer Field Data.
5-36	Route Reconnaissance and Classification.
6-40	Field Artillery Cannon Gunnery.
6-135	Adjustments of Artillery Fire by the Combat Soldier.
7-20	The Infantry Battalions.
11-40	Signal Corps Pictorial Operations.
17-1	Armor Operations.
17-37	Air Cavalry Squadron.
17-95	The Armored Cavalry Regiment.
21-5	Military Training Management.
21-6	Techniques of Military Instruction.
21-26	Map Reading.
21-30	Military Symbols.
24-18	Field Radio Techniques.
30-5	Combat Intelligence.
30-20	Aerial Surveillance—Reconnaissance, Field Army.
30-35	Military Intelligence Battalion, Aerial Reconnaissance Support.
31-36 (Test)	Night Operations.
(C)32-5	Signal Security (SIGSEC) (U).
(C)32-20	Electronic Warfare (U).
57-35	Airmobile Operations.
61-100	The Division.
100-5	Operations of Army Forces in the Field.
100-26	The Air-Ground Operations System.
101-5	Staff Officers' Field Manual: Staff Organization and Procedure.

3. Technical Manuals (TM)

1-250	Fixed Wing Flight.
1-260	Rotary Wing Flight.
1-380-series	(Aerial Observer Programmed Text.)

4. Army Subject Schedules (ASubjScd)

1-8 Aerial Observer Training.

5. Department of the Army Pamphlets (DA Pam)

108-1 Index of Army Motion Pictures and Related Audio-Visual Aids.
310-series (Military Publications Index.)

APPENDIX B

INSTRUCTORS' AIDS

Section I. INTRODUCTION

B-1. General

The information contained in this appendix is intended primarily for use by aerial observer course instructors. It covers the practical aspects of presentation of instruction and the preparation of instruction and of training aids pertaining to visual search training, recognition training, graphic orientation, and object location.

B-2. Training Aids

The training aids included in this appendix are examples of training aids which will add to the effectiveness of the aerial observer course presentation. Local requirements and production capability will govern the type and number of training aids available for use.

Section II. VISUAL SEARCH TRAINING

B-3. Guide for Presentation of Visual Search Training

a. General. Classroom instruction should be closely integrated with practical exercises. The aircraft should be of that type predominantly used by the unit in aerial observer missions. Prior to the student's arrival, the aircraft is parked in a level flight attitude. Strips of engineer tape (approximately 25 meters) are nailed to the ground to delineate the search orientation sectors. If small-scale models of military equipment are available, these are placed in the search sector for realism. Upon arrival at the aircraft, the student occupies the observer's seat and all safety items (parachute, helmet, seatbelts, shoulder harness, etc.) are fitted and secured. The instructor takes a position near the observer to one side of the observation work sector. The observer practices head and eye movement, searching in the prescribed manner. The instructor should insure that the student actually moves his head while practicing. When satisfied that the student has used the proper head movement and has noted the location of the work sectors in relation to the aircraft, the instructor may release him. He then repeats this procedure for each student in the class. See TM 1-380-series for individual training when field units lack qualified instructors or aids to conduct training.

b. In-flight Instruction Requirements. Requirements for in-flight instruction include—

- (1) Aviator training.
- (2) Controlled terrain.

- (3) Observation aircraft.
- (4) Recording materials (radio or notebook).
- (5) Ground objects.

c. Aviator Training.

(1) The primary role of the aviator is that of an assistant instructor; merely flying the observer over a training course is not sufficient. All aviators must be standardized on the—

- (a) Exact flightpath.
- (b) Instructional method and procedures.
- (c) Method of critique.

(2) It is the responsibility of the instructor to insure that the aviators are all flying the same flightpath and that airspeed and altitude are similar. Pretesting of aviators is required to insure accuracy of flight.

d. Controlled Terrain. Controlled terrain is ground area over which the aerial observer school has control, with only those objects required for training placed therein. It is necessary for the instructor to be able to determine whether or not the student has sighted a particular object. If the terrain is uncontrolled, it is difficult to determine whether or not the student was correct in his sightings and whether or not he performed visual search properly.

e. Observation Aircraft. Observation aircraft used by the aerial observer in actual operation should be employed.

f. Recording Material. Any activity which requires the aerial observer to move his eyes away

from the terrain will reduce his performance level. The best method is to use an in-flight recorder; however, these may not be readily available. A radio may be used with assistant instructor transcribing the observer's response. The least desirable method, because the eye loses contact with the terrain, is notetaking by the observer while in flight.

g. Ground Objects. The primary purpose of the observer's visual search mission is to allow him to practice what he has learned in classroom instruction. Large objects such as 5-ton trucks, 2 1/2-ton trucks, or other military equipment of this category are most desirable. Placing small items such as 4.2-inch mortars or 7.62mm machineguns will not enhance training at this time. The positioning of these items is contingent upon the terrain being used. (See diagrams of visual search area, fig. B-1 and B-2.)

h. In-flight Training. Four steps to be consid-

ered in in-flight training are preparation, demonstration, in-flight practice, and critique.

(1) *Preparation.* All previous visual search training material plus the actual preparation of the aerial observer for the mission is included in the preparation phase. The student must be secured in the aircraft, instructed as to the direction in which to search, and briefed on any instructions that the aviator may give him while in flight.

(2) *Demonstration.* This demonstration should include nap-of-the-earth flying. While en route to the training area, the aviator demonstrates the change in the apparent movement of ground objects whenever the aircraft's speed/altitude varies.

(3) *In-flight practice.* Prior to entry on the training course, the aviator alerts the observer that in (x) seconds he will be in the training area: he again tells him the direction in which

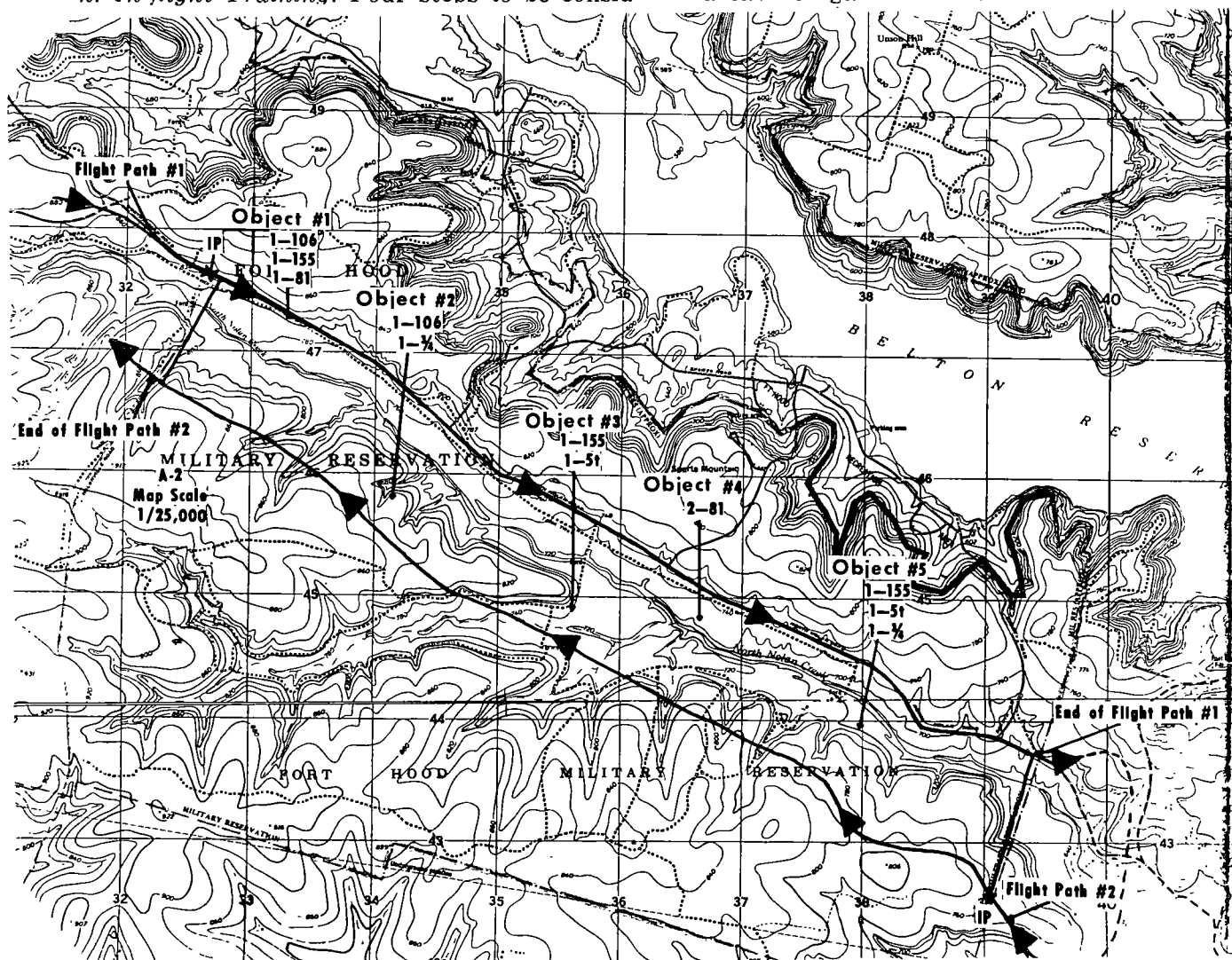


Figure B-1. Type course for visual search training.

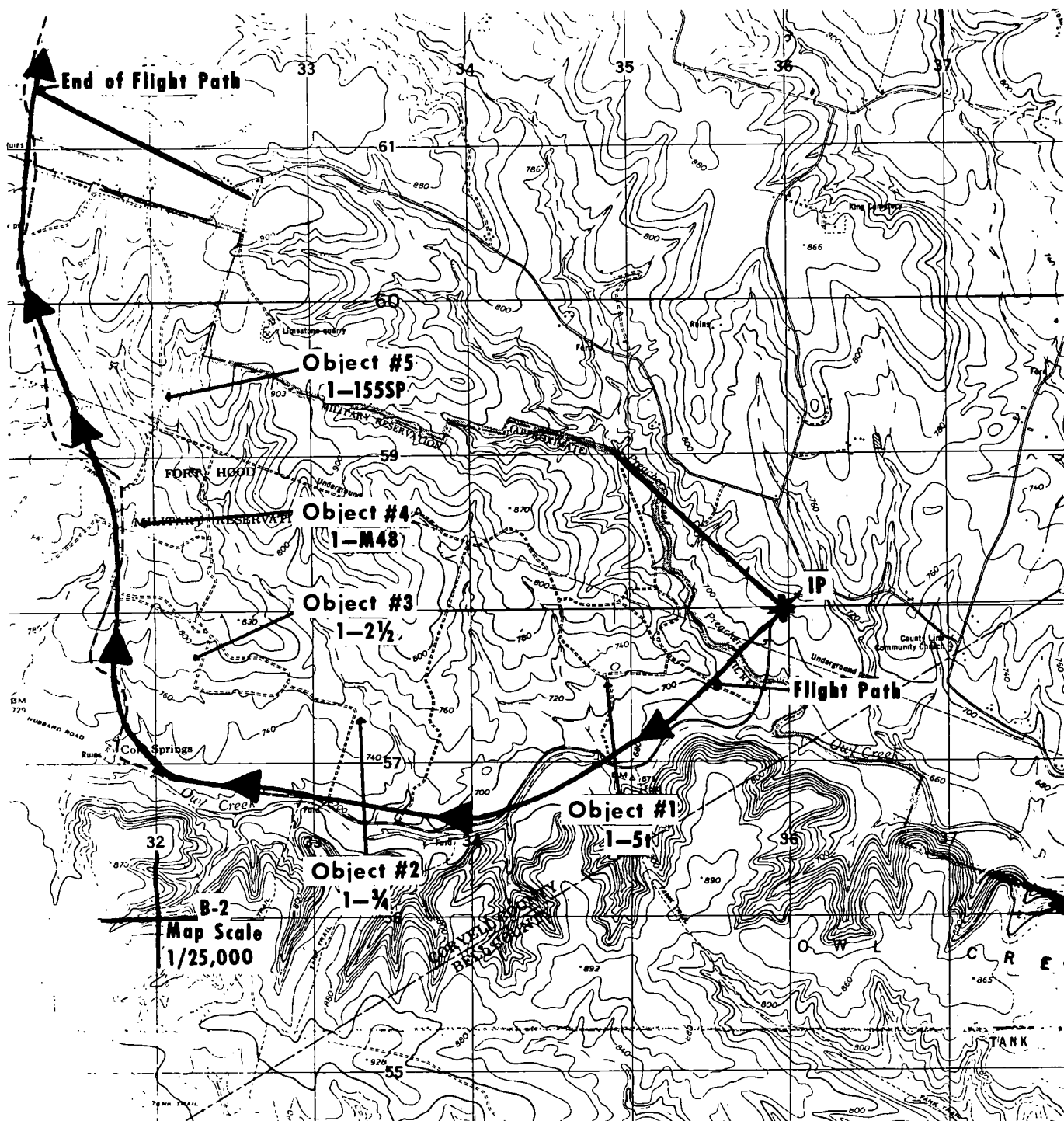


Figure B-2. Type course for visual search training.

to look. The aviator then stabilizes his observation altitude at 50 feet or below (depending on terrain) and tells the observer when he is over the starting point of the course. After flying the course, he tells the observer that the flight course has ended. The aircraft is then flown back to the starting point and the aviator tells the observer that he will refly the course and point out the

objects to him.

(4) *Critique.* While reflight the course, the aviator points out all objects to the observer. Four problems will be of primary interest:

(a) *Problem 1:* Observer did not report enough of the distant objects.

Possible cause: Observer is not scanning out far enough.

(b) *Problem 2:* Observer did not report enough of the near objects.

Possible cause: Observer is not scanning in close enough.

(c) *Problem 3:* Observer had few reports when compared to actual object display.

Possible cause: Observer did not scan rapidly enough.

(d) *Problem 4:* Observer reports only one object when two were in line, one near and one far.

Possible cause: Observer is "locking" his eyes on a single object too long. To aid in correcting this, a 5-inch mirror attached to a rubber suction cup may be placed inside the aircraft in a position which will allow the aviator to monitor the observer's head movement while in flight. If the aviator notes that head movement is not occurring during flight, he should remind the observer to move his head.

i. *Debriefing.* Upon completion of the flight, the observer should be debriefed by the classroom instructor to ascertain any visual search problems encountered while in flight and to give corrections.

B-4. Guide for Development of Training Material

Materials to be used include a terrain board,

overhead projector slides, and blackboard or charts.

a. *Terrain Board* (fig B-3). The board display should be drawn with the dimensions of depth to show the angle covered by foveal vision (5°). When this angle is used, the terrain area covered greatly increases as the range increases. Movable strings threaded through a hole in the drawn observer's eye (in cockpit of depicted aircraft) allow the instructor to move the strings from a near location to a far location, thereby indicating that foveal area coverage changes with distance.

b. *Overhead Projector Slides and 35mm Slides.* All illustrations shown in this section of the appendix may be made into overhead projector slides or 35mm slides and used to enhance the instruction of aerial observers.

c. *Blackboard or Charts.* In drawing the search sector, metallic strips may be used to delineate the work areas, thereby allowing variations in the forward limits of the orientation sector to change, dependent on the type aircraft used. Search patterns may also be drawn showing visual search techniques.



Figure B-3. Terrain board.

NAME _____ RANK _____ SERIAL NO. _____

ORGANIZATION _____

SESSION NO. R- _____

DATE _____

SLIDE NO.	OBJECT	SLIDE NO.	OBJECT
1		16	.....
2		17	.....
3		18	.....
4		19	.....
5		20	.....
6		21	.....
7		22	.....
8		23	.....
9		24	.....
10		25	.....
11		26	.....
12		27	.....
13		28	.....
14		29	.....
15		30	.....

Figure B-4. Recognition training worksheet.

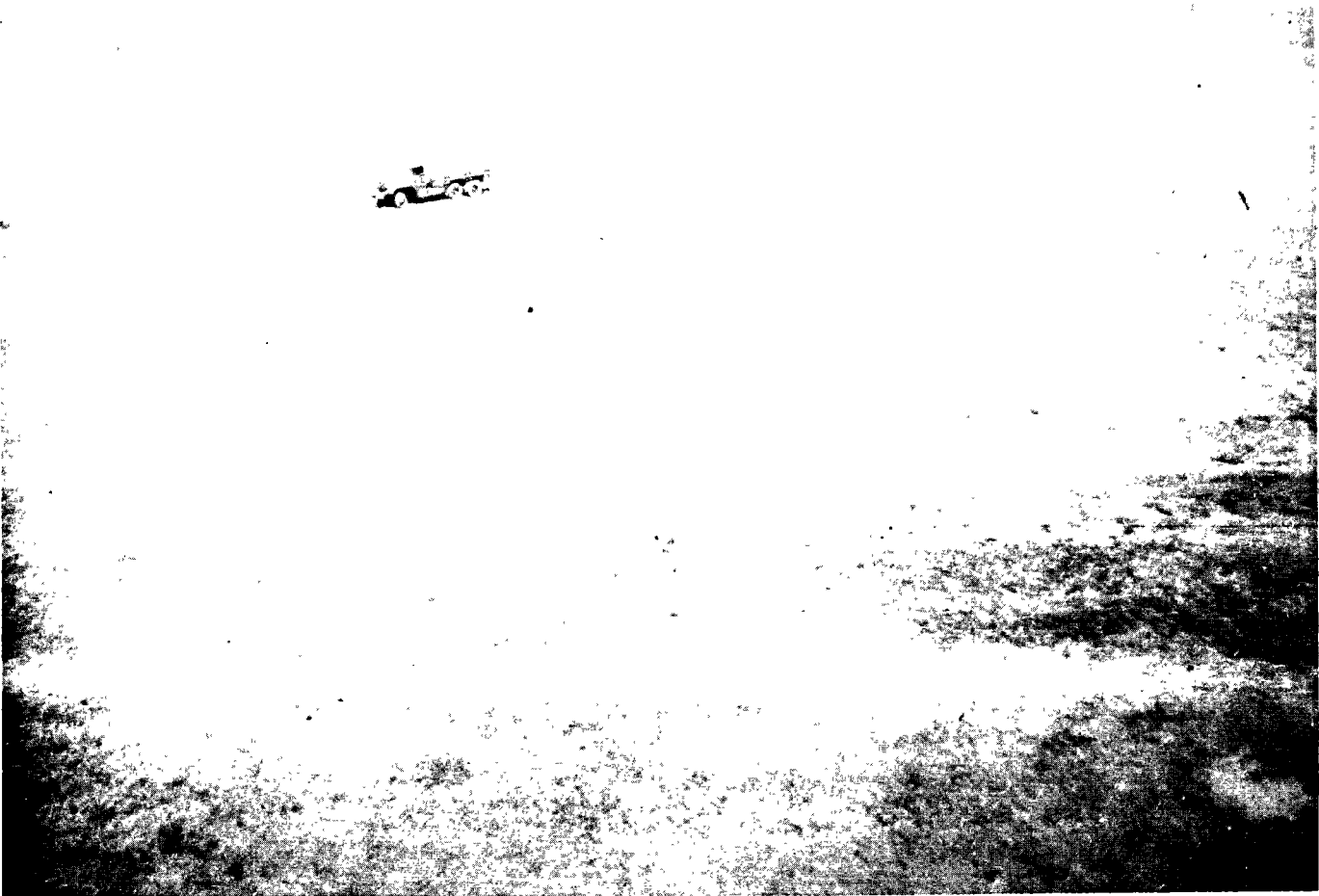


Figure B-5. Recognition training slide: 5-ton cargo truck, condition SR,C.

Section III. RECOGNITION TRAINING

B-5. Guide for Presentation of Recognition Training

a. Classroom Training.

(1) *Method of presentation.* A variety of slides will be shown the students in the classroom. The projectionist will show a slide for 5 seconds. Individuals in the classes are instructed to *verbally* respond first, then write their answers on their worksheets. A sample worksheet is shown in figure B-4. Motivation may be accomplished by calling on certain individuals to

describe their observation. Testing procedures may be implemented by merely deleting the verbal response.

(2) *Sequence of presentation.* The slides are presented in a systematic, progressive manner. The initial stage places the observer near a single object and without surrounding clutter; the sequence gradually progresses until maximum viewing distance and maximum clutter are shown. Figures B-5 through B-11 illustrate the type slides to be used in this presentation.



Figure B-6. Recognition training slide: 5-ton cargo truck, condition SR₁C₁.

b. In-Flight Practice.

(1) The following guidance used in visual search training is also applicable for in-flight object recognition practice.

- (a) Aviator training.
- (b) Controlled terrain (a type course is shown in fig B-12).
- (c) Recording procedures.
- (d) Aviator procedures.
- (e) Critique.

(2) Where possible, the equipment placed on the object course should cover all conditions discussed in the classroom, to include distance to object, clutter, single and multiple object presentations, and types of objects. Prior selection of object placement areas is important in order to offer varying conditions to the aerial observer.

B-6. Guide for Development of Training Material

(See also TM 1-380-series.) Materials and equipment used are an observation helicopter, 35mm

camera and color film, and military equipment objects such as M-60 tank, 3/4-ton truck, etc.

a. Training Material. The 35mm color slides, when shown in the classroom, provide in-flight views of military items of equipment. The slides should show all items that the observer must be trained to recognize under varying conditions of distance and natural concealment. The observer must be able to recognize objects at all distances within the capability of the human eye, and to recognize objects when they are partially obscured by surrounding vegetation. A method for doing this is to establish at least three categories for both the distance to the object and the amount of surrounding vegetation. For this purpose the distance to the object will be defined as *slant range* (SR) and will vary from near distances (SR₁) through medium distances (SR₂) to far distances (SR₃). The surrounding vegetation will be defined as *clutter*. Clutter will vary from parade ground vegetation (C₁) through light brush or trees (C₂) to heavier obscuring vegetation (C₃).



Figure B-7. Recognition training slide: 5-ton cargo truck, condition SR_3C_2 .

(1) *Slant range (SR)*. The slant range is the distance from the eye (camera) to a particular object being viewed (photographed). Slant range considered herein will be translated into the ratio of the major axis of a piece of equipment to the total lateral area of a 35mm slide. (As altitude decreases toward zero, the slant range gradually becomes ground distance.)

(a) *Slant range 1 (SR_1)*. Slides illustrating SR_1 should be taken from a distance which results in the major axis of the object being not less than one-fourth the width of the slide. In terms of details, all the major and most of the minor details which contribute to the uniqueness of the item are apparent.

(b) *Slant range 2 (SR_2)*. Slides illustrating SR_2 should be taken from a distance which results in the major axis of the object being approximately one-tenth to one-fourth the width of the slide. All of the major details which contribute to the uniqueness of the object are clear at these distances, but the minor details are not as obvious as at SR_1 .

(c) *Slant range 3 (SR_3)*. Slides illustrating SR_3 should be taken from a distance which results in the major axis of the object being less than one-tenth the width of the slide. At these distances, all of the minor and some of the major details of the items appear indistinct.

(2) *Clutter*. Clutter is defined as vegetation and the property of the terrain, to include color and texture of the area surrounding the object.

(a) *Clutter 1 (C_1)*. The items in slides illustrating C_1 should be photographed against a relatively homogeneous background, such as a parade ground, so that the item is in full view and dominates the slide.

(b) *Clutter 2 (C_2)*. These objects should be photographed near distinctive terrain features, vegetation, or shadows. In the case of small weapons, semitactical positions (i.e., machinegun emplacements) are employed. The items are placed in such a manner that they are either separated from or adjacent to the background features, but in no case is more than one-third of the item obscured by such features.



Figure B-8. Recognition training slide: 5-ton cargo truck,
condition SR_1C_1 .

(c) *Clutter 3 (C_3)*. Items in slides illustrating C_3 should be photographed against backgrounds which contain more irregularities than those of the C_2 slides. The items are placed so that, in terms of color and configuration, advantage can be taken of natural camouflage. The actual amount of concealment offered by this camouflage results in not more than two-thirds of the item being covered; generally, one-half or less of the item is concealed. In no case, however, is the item separated from the background features.

b. *Pictorial Method of Development*. The slides used in recognition training should be taken from an altitude of 50 to 200 feet above the

altitude of the object. The photographer, when looking through the viewfinder, should use the guidelines established in slant range, above. All slides are taken in color, and the orientation of the object to the camera (e.g., end view, side view, and variations thereof) is unsystematically varied. This permits complete coverage on an item from all views.

c. *Total Requirement*. Approximately 340 usable slides are required: 160 of single objects (SR_1C_1 through SR_3C_3) and 180 of multiple objects (2 to 6 items, low through high difficulty).

d. *Film Cataloging*. After slides are selected, they should be cataloged and numbered in sequence in this manner:

Period 1 Slides 1-40	(SR_1C_1)	Single items
Period 2 Slides 41-100	(SR_2C_2)	Single items
Period 3 Slides 101-160	(low difficulty level)	Multiple items
Period 4 Slides 161-240	(SR_3C_3)	Single items
Period 5 Slides 241-300	(medium difficulty level)	Multiple items
Period 6 Slides 301-340	(high difficulty level)	Multiple items

Note. A slide key, listing number(s) and object(s), should be made a portion of the narrative for projectionist and instructor reference.



*Figure B-9. Recognition training slide: 2 M-113s, 1 M-60,
low difficulty level.*



*Figure B-10. Recognition training slide: 2 M-60s,
1 M-113, medium difficulty level.*



*Figure B-11. Recognition training slide: 2 M-60s,
2 M-113s, high difficulty level.*

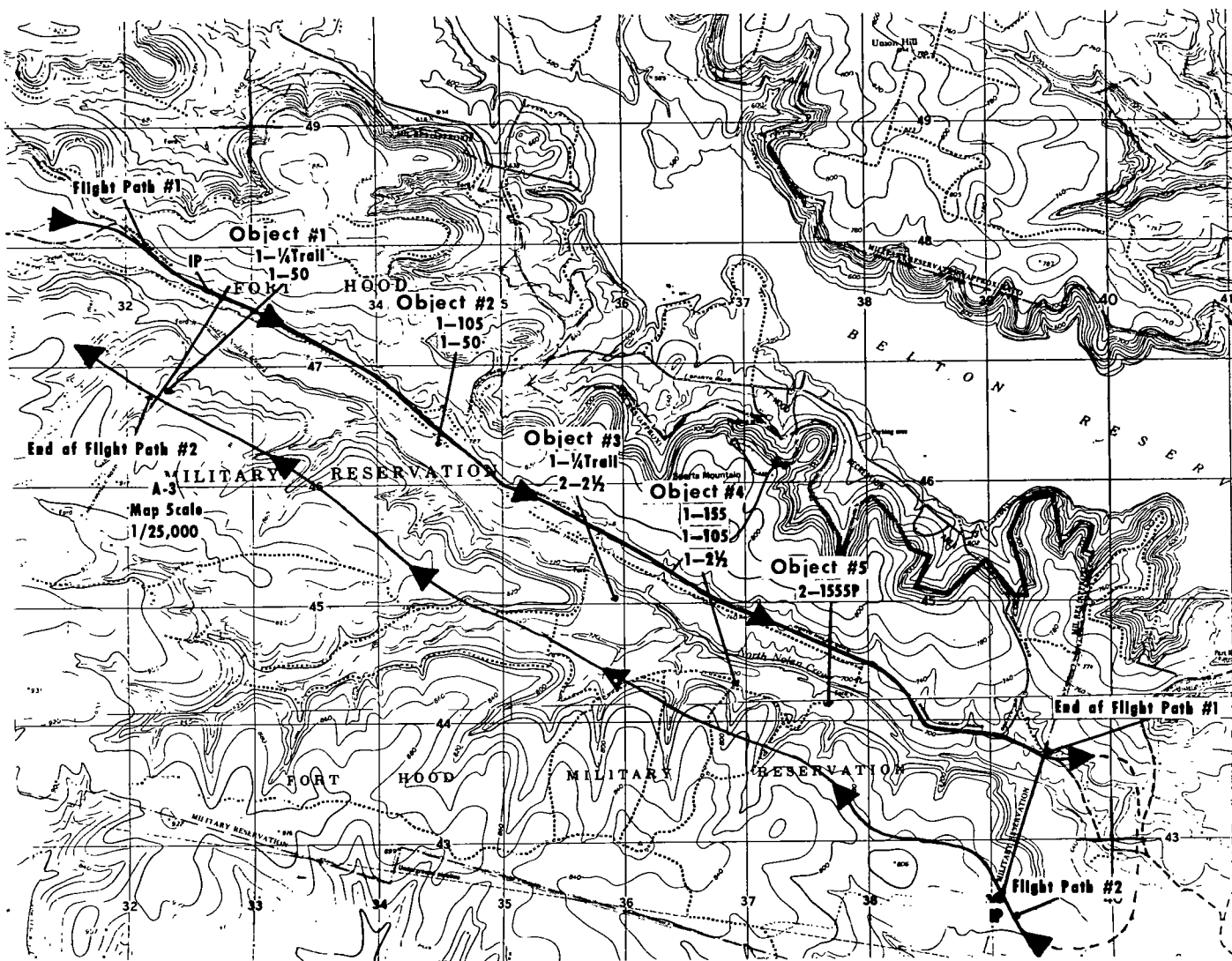


Figure B-12. Type course for object recognition training.

e. Multiple Object Combinations. It is necessary to modify the categories of slant range and clutter when developing multiple objects. The slant range and clutter values for a 1/4-ton truck are not the same as for a 5-ton truck. When these two items are placed together in a multiple object situation, the instructor will have to cat-

egorize the slide based on his opinion as to whether its difficulty level is low, medium, or high.

Note. When developing a film library, caution should be taken to insure that the level of difficulty does not exceed the observer's ability. All objects should fall within the average maximum detection ranges given in table 3-1.

Section IV. GRAPHIC LOCATION

B-7. Guide for Presentation of Graphic Orientation Training

(See also TM 1-380-series.)

a. Classroom Training.

(1) *Method of presentation.* The aerial observer receiving graphic orientation training is shown colored slides of various terrain features. The photographs are taken from three altitudes above the level of the terrain feature and from nine different directions (fig B-13—B-21).

These varied views should give the observer a good idea of how the appearance of a terrain feature can change relative to the angle and height from which it is seen. To give the observer optimum practice in graphic orientation, presentation of slides should be varied at random by altitude and height.

(2) *Sequence of presentation.* Progressive levels of difficulty, contingent upon geographic



*Figure B-13. Graphic orientation slide for grid 3-D,
map F; photographed from 180° at 2,000 feet.*



*Figure B-14. Graphic orientation slide for grid 3-D,
map F; photographed from 180° at 1,100 feet.*



Figure B-15. Graphic orientation slide for grid 8-D, map F; photographed from 180° at 200 feet.

terrain features available in the unit area, must be determined by the instructor (para B-8b).

(3) *Maps.* The maps used in training (fig B-22) are folded and inserted in an acetate binder. In order to reuse the folders, the acetate is marked with grid crosses in four corners. The top margin is labeled A, B, C, etc., and the left margin is marked 1, 2, 3, etc., downward, all of which are in grid square increments. The initial orientation is given the student by stating, "Look in grid square _____ (A3, B6, etc.) for the _____ (terrain feature)."

b. In-Flight Training. Prior to flight, the aerial observer is given a map (fig B-23) and two grease pencils, and then is briefed on his job requirement, including the method to be used in marking his map. Upon arrival over the grid square designated, the aviator insures that altitude is stabilized at 50 to 100 feet (depending on terrain and airspeed) and alerts the observer that he is over a specified area. He then flies the prescribed flight course without giving any

further assistance to the observer. Upon completing the first flight over the course, the aviator may replace the grease pencil with one of a different color to enable the observer to correct his mistakes. The remainder of the flight then becomes the critique.

c. Critique.

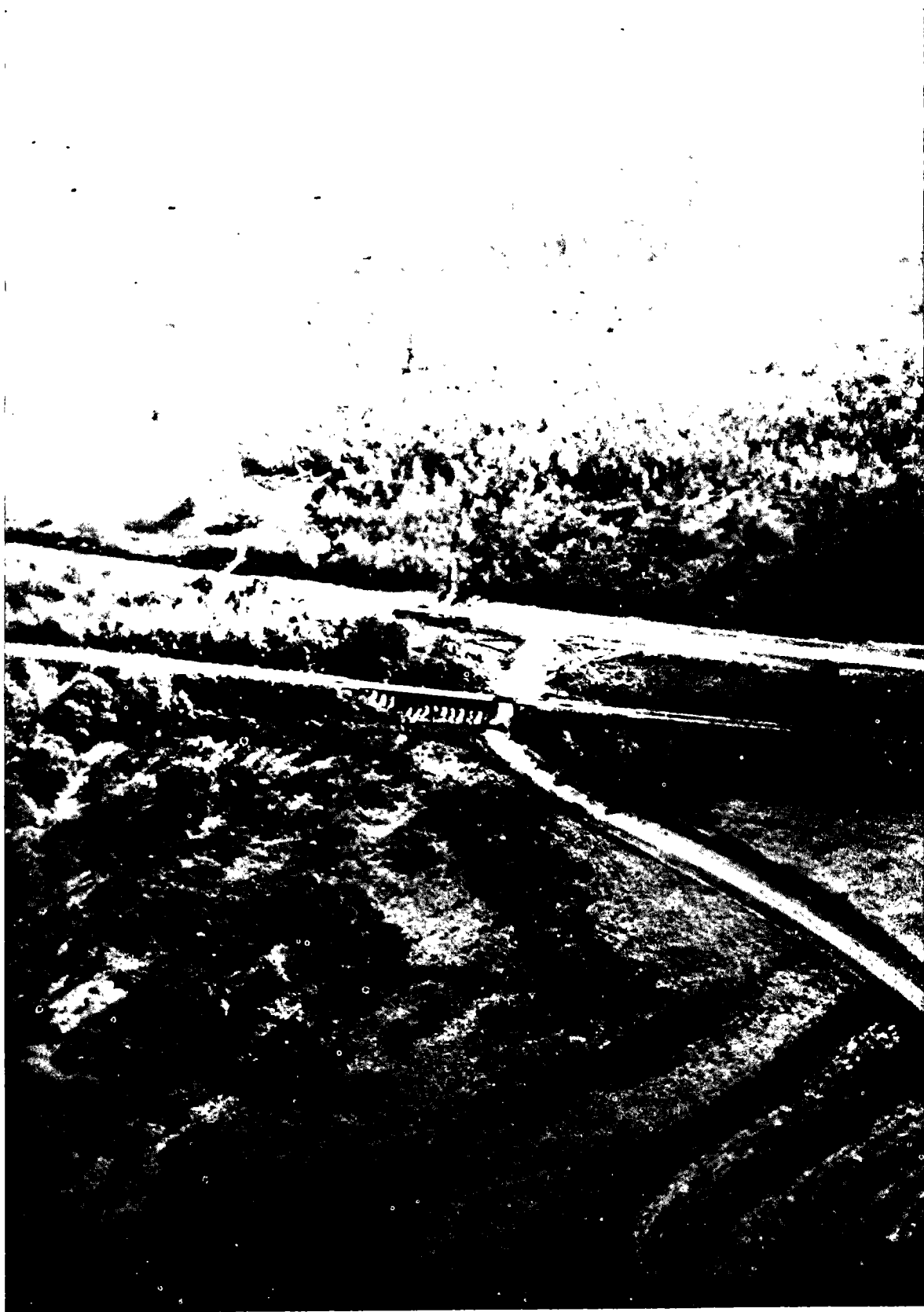
(1) The observer is flown back over the course at an altitude of 200 to 500 feet and the terrain features (which are randomly numbered) are pointed out by stating, "Number _____ coming up on the left, number _____ coming up on the right," etc. With a different colored pencil, the observer may then re-mark his flight course.

(2) Upon returning to the airfield, the aerial observer should be critiqued on his flight course and a comparison made on the variance in colored arrows (which should trace the flight course) on his map and the master flight diagram.

Note. Figure B-23 is a master flight diagram. The



*Figure B-16. Graphic orientation slide for grid 3-D,
map F; photographed from 360° at 2,000 feet.*



*Figure B-17. Graphic orientation slide for grid 3-D,
map F; photographed from 360° at 1,100 feet.*



Figure B-18. Graphic orientation slide for grid 3-D,
map F; photographed from 360° at 200 feet.

student's map will show terrain features without a flight-path.

B-8. Guide for Development of Training Manual

Materials used are an observation helicopter, 35mm camera and color film, tactical maps scale 1:25,000 or 1:50,000, and compass rose (fig B-24).

a. Description of Graphic Orientation Features. Graphic orientation terrain features which should be used for training will vary from one area to another. The unit should use features which will best represent actual or anticipated operational area requirements.

b. Selection Factors. Terrain features selected for use in training should meet the following qualifications:

(1) *Uniqueness of identity.* Terrain features must be so laid out that they are not readily confused with other features of the same sort in the near vicinity.

(2) *Permanent or semipermanent objects (natural or manmade).* A house on a road would be a poor selection because of the lack of permanency. A bridge over a river may be destroyed; however, the road approaches and bridge abutments would indicate that the bridge was

once there. Use terrain features which will not be markedly changed by enemy action or time.

(3) *The twosome rule.* This rule states that a single feature is not sufficient for ready identification of that feature when compared to a map or chart. A river may be a terrain feature, but it is a poor selection unless it is associated with a bridge, a roadway curve, a railroad, or a community. The rule holds true for a road junction, which should be accompanied by a group of buildings (possibly indicated by foundations or rubble), a creek, or a railroad. For orientation training, always associate a second feature with the primary feature to be used.

c. Method of Development. Four steps are required for the development of film material. These are—

(1) *Detailed map study.* For selection of terrain features to use.

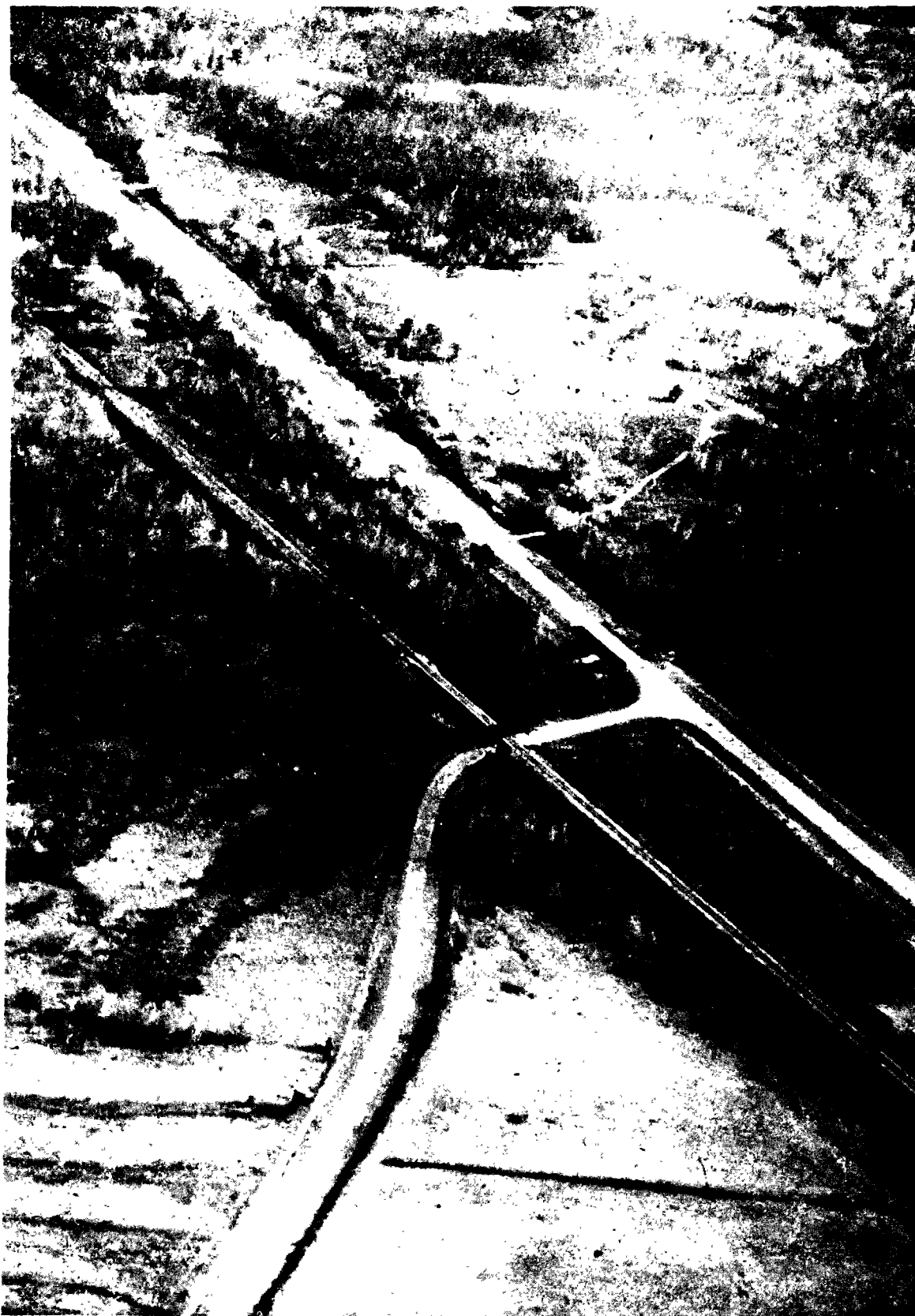
(2) *Aerial inspection.* To be performed on each location to verify map accuracy.

(3) *Preplanning.* Upon final selection of the terrain features, the aviator and photographer, along with the instructor, preselect the specific points over which the photographs will be taken and mark them on a map for in-flight use.

(4) *Photography.* The simplest method is to fly the highest altitude (2,000 feet actual)



*Figure B-19. Graphic orientation slide for grid 3-D,
map F; photographed from 315° at 2,000 feet.*



*Figure B-20. Graphic orientation slide for grid 3-D,
map F; photographed from 315° at 1,100 feet.*



Figure B-21. Graphic orientation slide for grid 3-D,
map F; photographed from S15° at 200 feet.

over the preselected points, then repeat at 1,000 feet and again at 100 to 200 feet (35mm camera, normal focal length, color film). The photograph should be taken on the following headings from the object: 0° north, and each succeeding 45° increment around the compass. Each compass heading will be repeated (except where not feasible due to masking effects of terrain) at each altitude. Range will be varied to complete the required number of slides (*e* below).

d. Film Library. Selection of training slides should be based on—

(1) *Picture quality.* Poor quality photographs should be discarded.

(2) *Variations of altitude and compass headings.* When compiled into a training series, random selection of headings and altitudes should occur for all terrain locations. One example of random selection is as follows:

Slide No.	Photographed from—	Altitude
1	180°	2,000 ft
2	225	200
3	000	1,000
4	270	200

(3) *The map used in flight (c(1) above).* This will be of value in retaking and supplementing photographs of a particular terrain feature.

e. Film Requirement. Approximately 20 slides per location are desirable. A total of 280 slides are required, any portion of which may be used as a test. The first training period will consist of two terrain features; the second through fourth periods will consist of four terrain features. Each feature will consist of 10 slides at 100 to 200 feet and 5 each from 1,000 to 2,000 feet, all of which should give varied compass

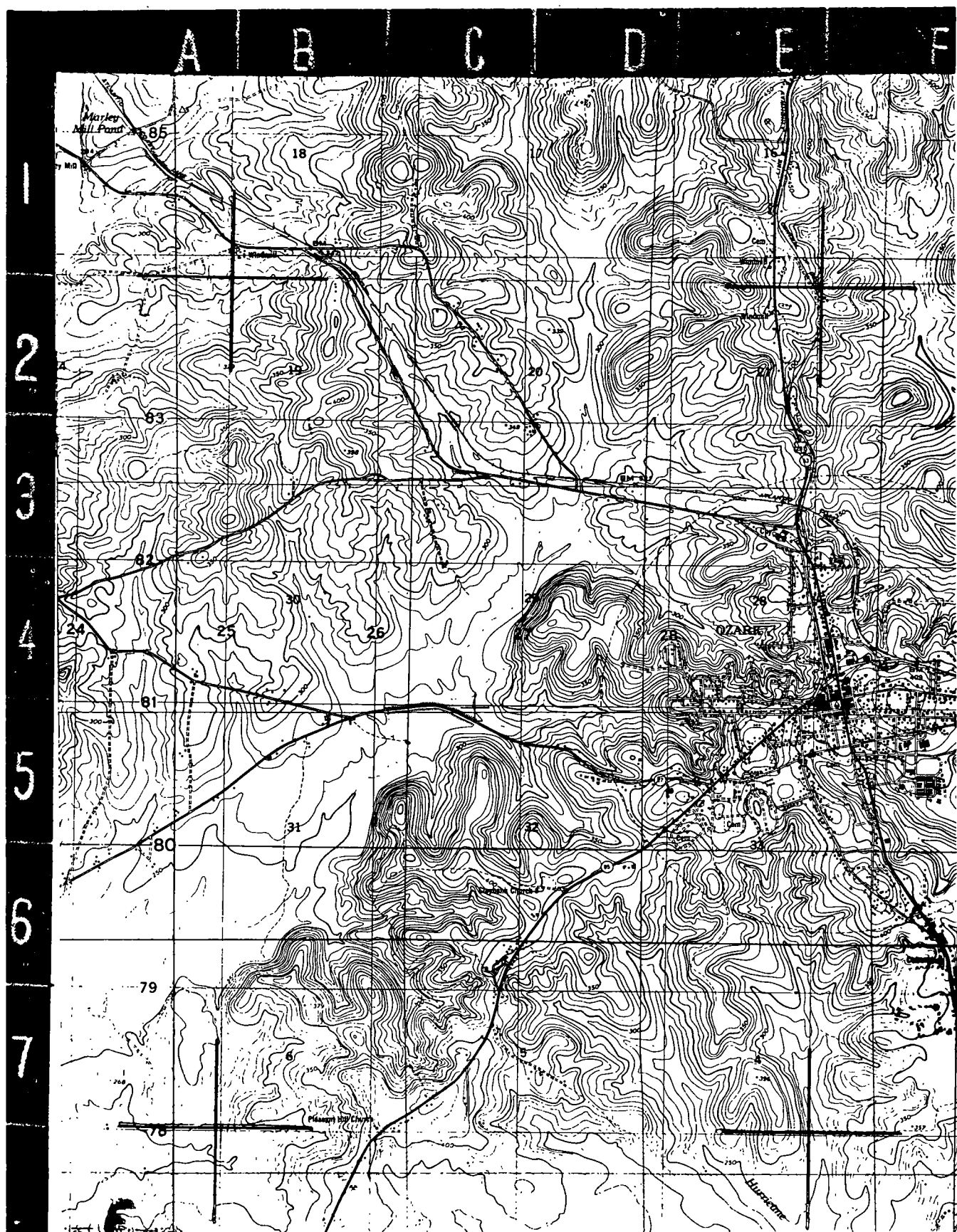


Figure B-22. Map F, used in graphic orientation training.

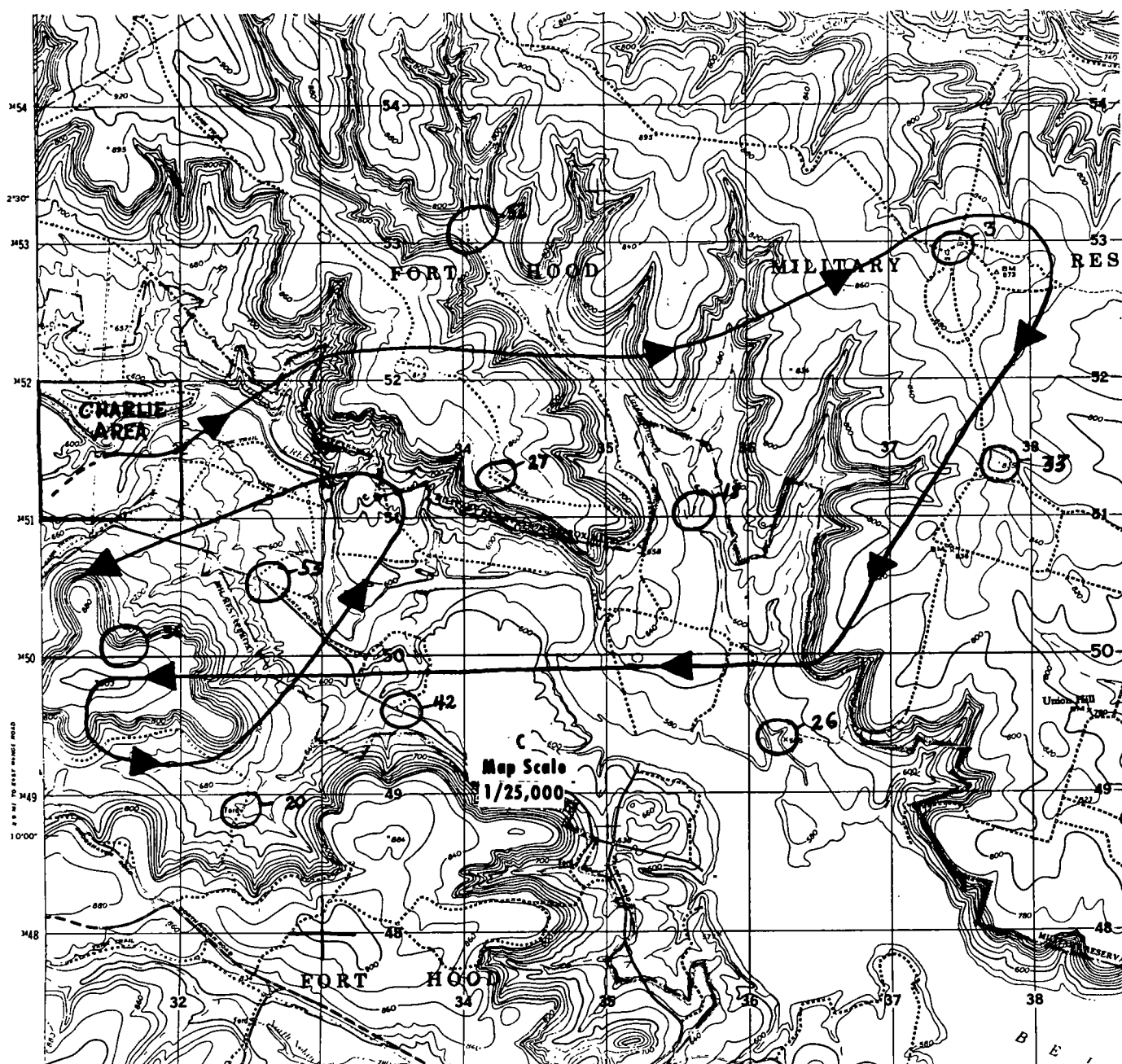


Figure B-23. Type course for graphic orientation training, object area C.

coverage of the terrain feature. Examples of pictures are shown in figures B-12 through B-20.

f. Map Folders. The map folder is constructed by placing a piece of acetate over a stiff backing and then taping on three sides. The grid numbering and lettering system is printed on the top and side. Four grid alignment crosses are

superimposed on the acetate to enable quick alignment of the inserted map. Subsequent maps needed are prefolded to fit the folder and are numbered. The student, on request, will insert the map needed for subsequent training sessions.

g. Worksheet. A sample graphic orientation training worksheet is shown in figure B-25.

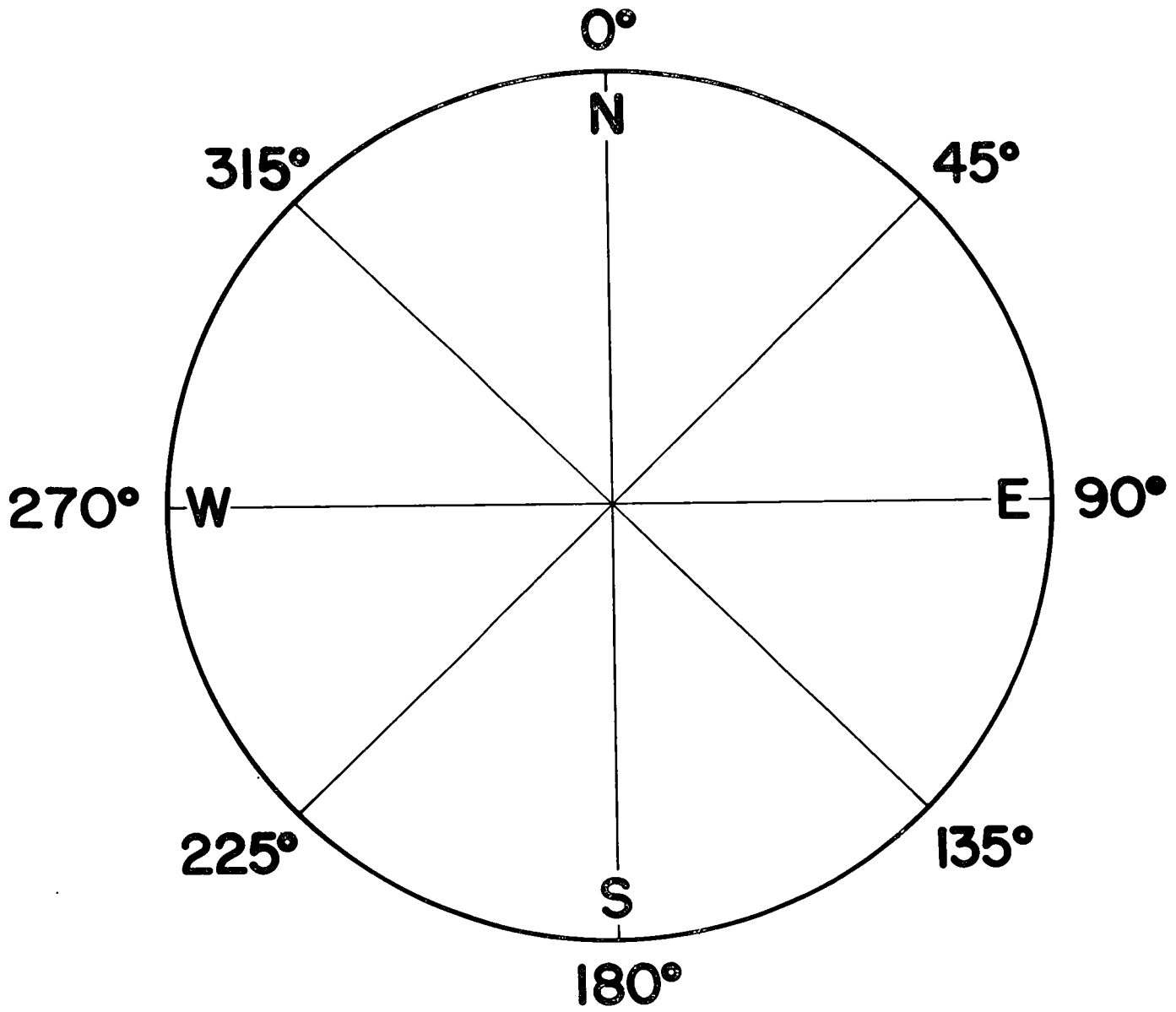


Figure B-24. Compass rose.

NAME _____ RANK _____ SERIAL NO. _____

ORGANIZATION _____

SESSION NO. 0- _____

DATE _____

SLIDE NO.	DEGREES	SLIDE NO.	DEGREES	SLIDE NO.	DEGREES
1		15	.....	29	.....
2		16	.....	30	.....
3		17	.....	31	.....
4		18	.....	32	.....
5		19	.....	33	.....
6		20	.....	34	.....
7		21	.....	35	.....
8		22	.....	36	.....
9		23	.....	37	.....
10		24	.....	38	.....
11		25	.....	39	.....
12		26	.....	40	.....
13		27	.....		.....
14		28	.....		.....

Figure B-25. Graphic orientation training worksheet.

Section V. OBJECT LOCATION

B-9. Guide for Presentation of Object Location Training

(See also TM 1-380-series.)

a. Classroom Training.

(1) The aerial observers are shown two colored slides in sequence for each object location. The first slide is a graphic orientation feature which is of the same type shown in his preceding training except that altitude for object

location is held constant at 100 to 200 feet. The second picture showing the object viewed is 90° to the right or left of the flightpath to the graphic orientation feature. Both slides are taken over the same ground point and at the same altitude. In all cases a large vehicle, such as a 5-ton truck, should be used as the object to be located. Figures B-26 through B-37 illustrate the type slides to be used.



Figure B-26. Initial orientation slide, map 4, grid 4-B, viewed from 90°.

(2) Classroom procedures are a combination of those in graphic orientation and the additional procedures required for object location. The steps are as follows:

(a) Tell the students which grid square of the map (fig B-38) to look in.

(b) Project the graphic orientation slide on the screen and have the observers identify the direction from which it is viewed.

(c) Have an observer respond with direction.

(d) State that the terrain feature shown is directly ahead of the aircraft's position and the aircraft is flying toward it. This would be a view that the aviator and observer in an observation aircraft might see.

(e) Direct their attention right or left from the flightpath (whichever direction is correct for the location slide).

(f) Project the object location slide.

b. In-Flight Practice.

(1) The following guidance is applicable to object location in-flight practice:



Figure B-27. Object location slide looking left.

- (a) Aviator training.
- (b) Controlled terrain.
- (c) Recording procedures.
- (d) Aviator procedures.
- (e) Critique.

(2) Additional requirements for in-flight practice are ground and object conditions. Object conditions for object location training should be similar to object recognition training. To enable the instructor to evaluate the student's progress, all objects used in object location training must be engineer-surveyed into location. A survey error of 10 meters in actual ground location is allowed. Type object courses are shown in figures B-39 and B-40.

(3) Prior to flight, the observer is handed an acetate-covered map (or strip map) showing the flightpath and the initial point. He is then briefed by the instructor on his mission which is to "search for, identify, and locate all objects within the area prescribed." He is handed two grease pencils and told to circle the object locations on his map. In-flight procedures discussed

for other phases of aerial observer training apply for object location training.

c. Critique. One method for in-flight critique is to request the observer to pass the grease pencils to the aviator after completing the object location flight. The observer is then handed an acetate overlay which shows the surveyed locations of the objects by a dot (center of object mass), a circle surrounding the dot, and the object number. The course is then reflown so that the observer can see where errors occurred.

B-10. Guide for Development of Training Material

Materials and equipment used are an observation helicopter, 35mm camera and color film, 5-ton truck (or other large vehicle), and tactical map of local area.

a. Selection Factors. Terrain selection criteria established for graphic orientation (para B-8b) apply to object location, except that graphic heading is not considered. After selecting a point over which to photograph the graphic



Figure B-28. Initial orientation slide, map 4, grid 4-B, viewed from 90°.

orientation feature, verify its suitability by looking 90° right or left of the inbound flightpath to the graphic feature. In the areas right or left of the flightpath, there must be a suitably clear location in which to position the object (e.g., 5-ton truck). If good site does not exist, continue to shift the proposed photographic point until the graphic orientation feature and object location area are compatible. The object does not appear on the graphic orientation slide.

b. Method of Development of Film Material. Four steps are required for the development of the film material. These are—

(1) *Detailed map study.* For selection of terrain features to include sufficiently clear areas in which to position the object.

(2) *Aerial inspection.* Of each location, to ascertain the accuracy of the map and the suitability of the area.

(3) *Preplanning.* Upon final selection of the terrain features and position, the aviator, the photographer, and the instructor preselect

the specific points over which the photographs will be taken and mark them on a map for in-flight use.

(4) *Photography.* A method by which the photographs may be taken is as follows:

(a) Position the object in the object location area.

(b) Fly 45° to the graphic orientation feature so that the flightpath is directly over the photographic point. If weather conditions and safety warrant, the helicopter is brought to a hover while the picture is taken of the graphic feature, and a pedal turn is made so the photographer may take the second picture 90° to the first. This procedure insures that both pictures are taken over the same ground point. If weather or safety does not permit hovering at 100 to 200 feet, the helicopter may be flown at a safe slow airspeed over the photographic point. The aircraft should then be reflight over the same precise point at the same altitude where the second picture is taken of the object. Range to



Figure B-29. Object location slide, grid 4-B, looking left.

the object may vary from 100 to 900 meters (see table 3-1).

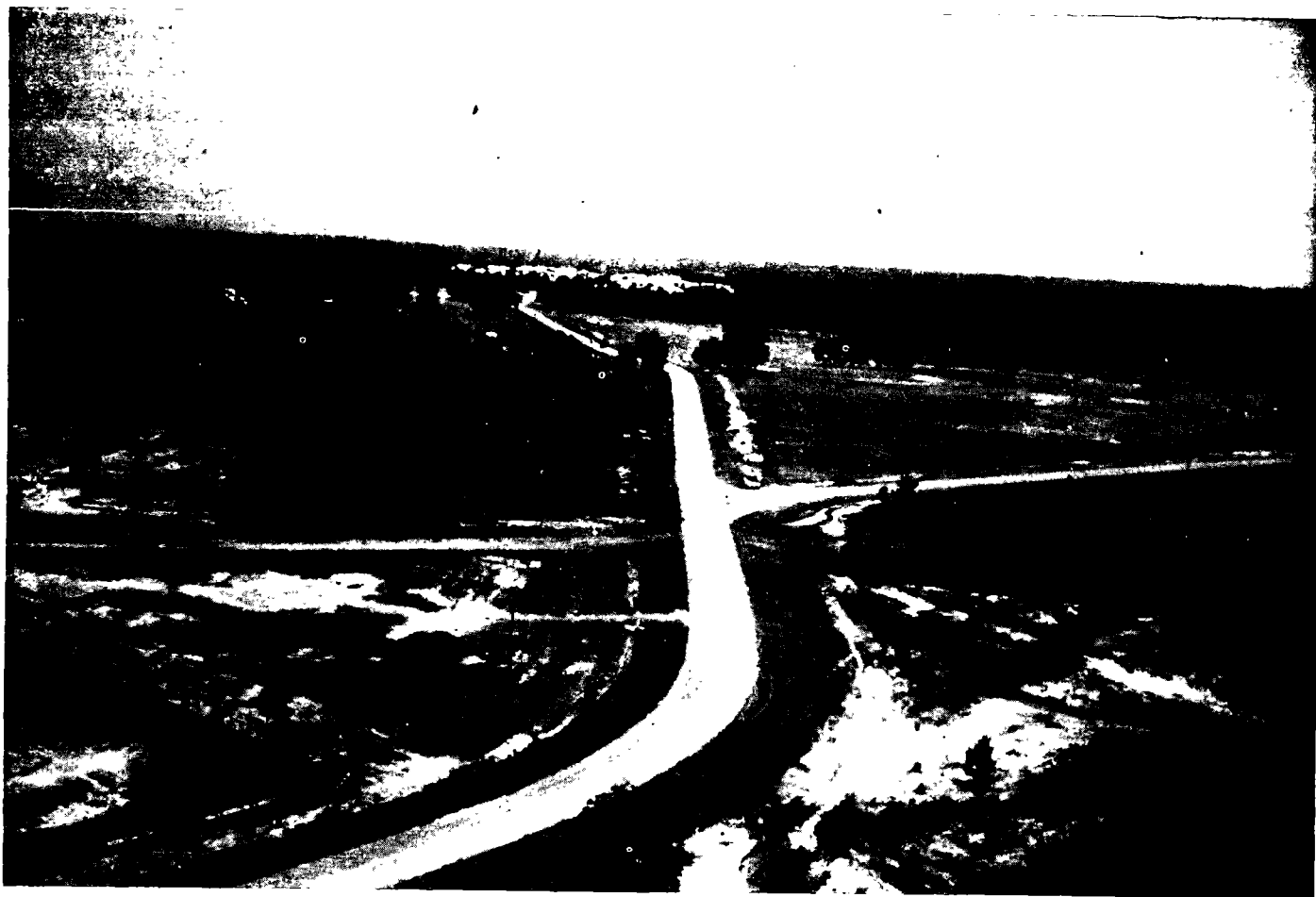
c. Film Library Selection. Selection of slides for training should be based on—

(1) *Picture quality.* Poor quality photographs should be discarded.

(2) *Suitability of the photographs to fulfill the object location requirement.* More than one picture may be taken using the same graphic

orientation feature and the same inbound flight-path, by shifting the object to another site away from the first. The map mentioned in *b(3)* above will be of assistance in retaking or supplementing any of the photographs of a particular object location.

d. Map Folder. The map folder used in object locations training is the same as that used in graphic orientation training.



*Figure B-30. Initial orientation slide, map 4, grid 4-B,
viewed from 135°.*

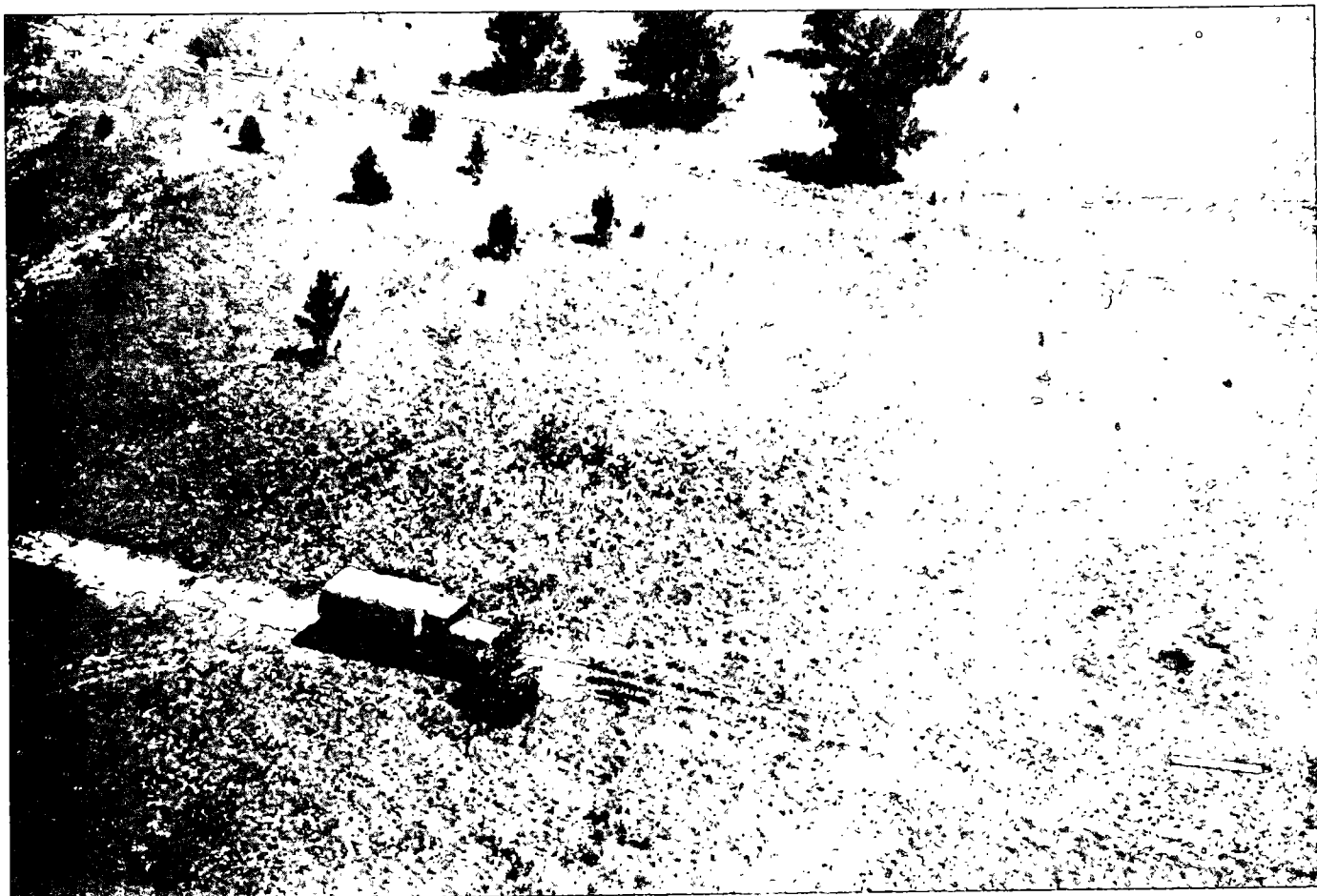


Figure B-31. Object location slide looking left.



*Figure B-32. Initial orientation slide, map 4, grid 4-B,
viewed from 135°.*

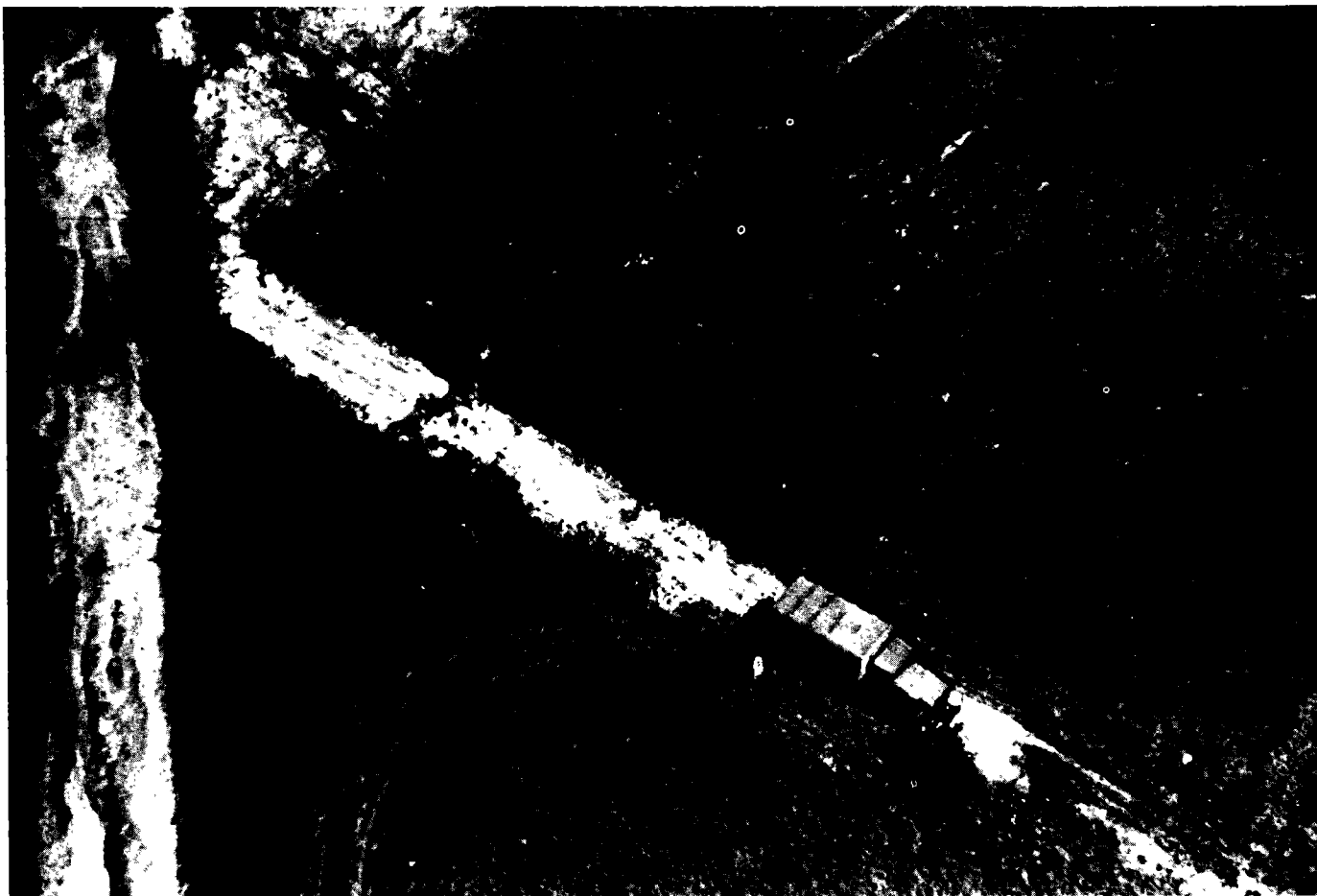


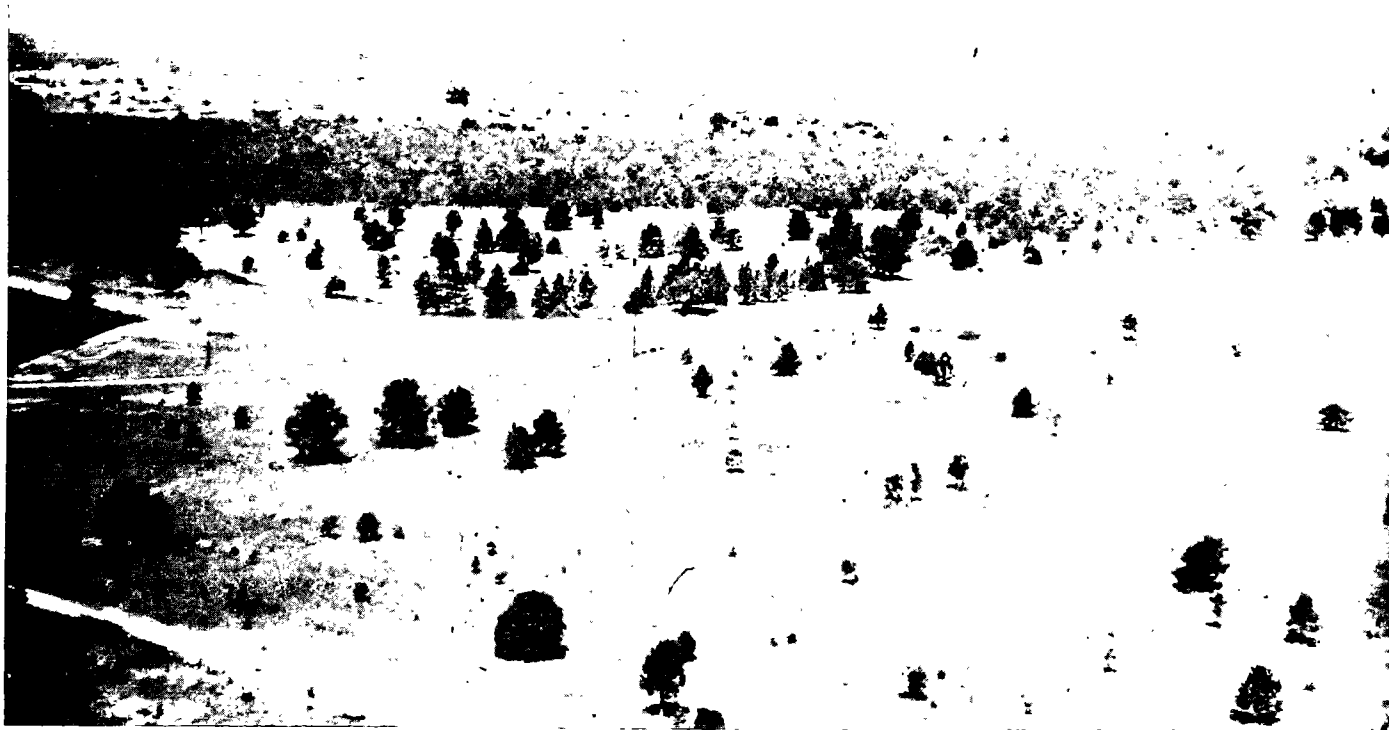
Figure B-33. Object location slide looking right.



Figure B-35. Object location slide, grid 4-B, looking left.



Figure B-35. Object location slide, grid 4-B, looking left.



*Figure B-36. Initial orientation slide, map 4, grid 4-B,
viewed from 90°.*



Figure B-37. Object location slide looking left.

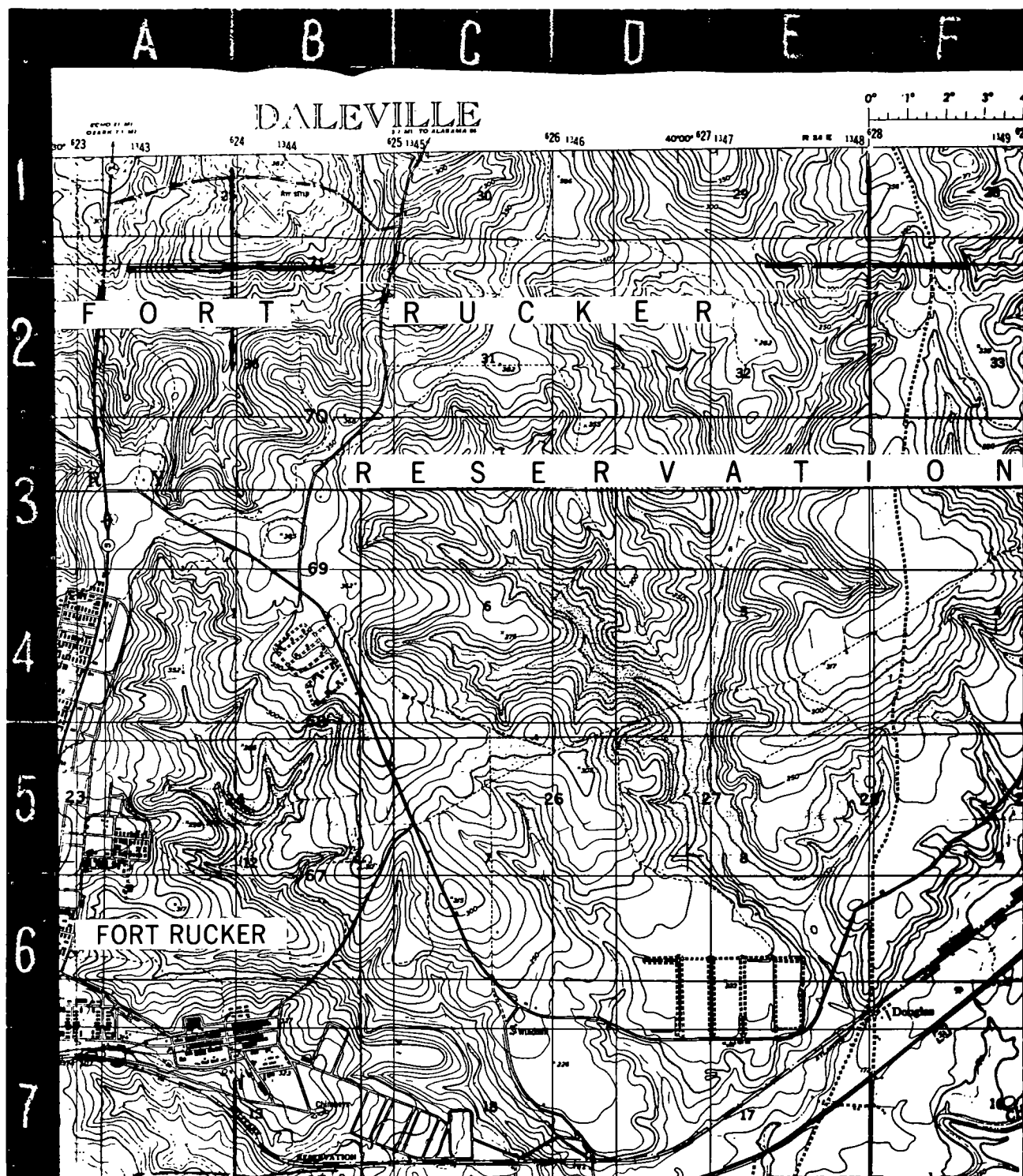


Figure B-38. Map 4 for object location training.

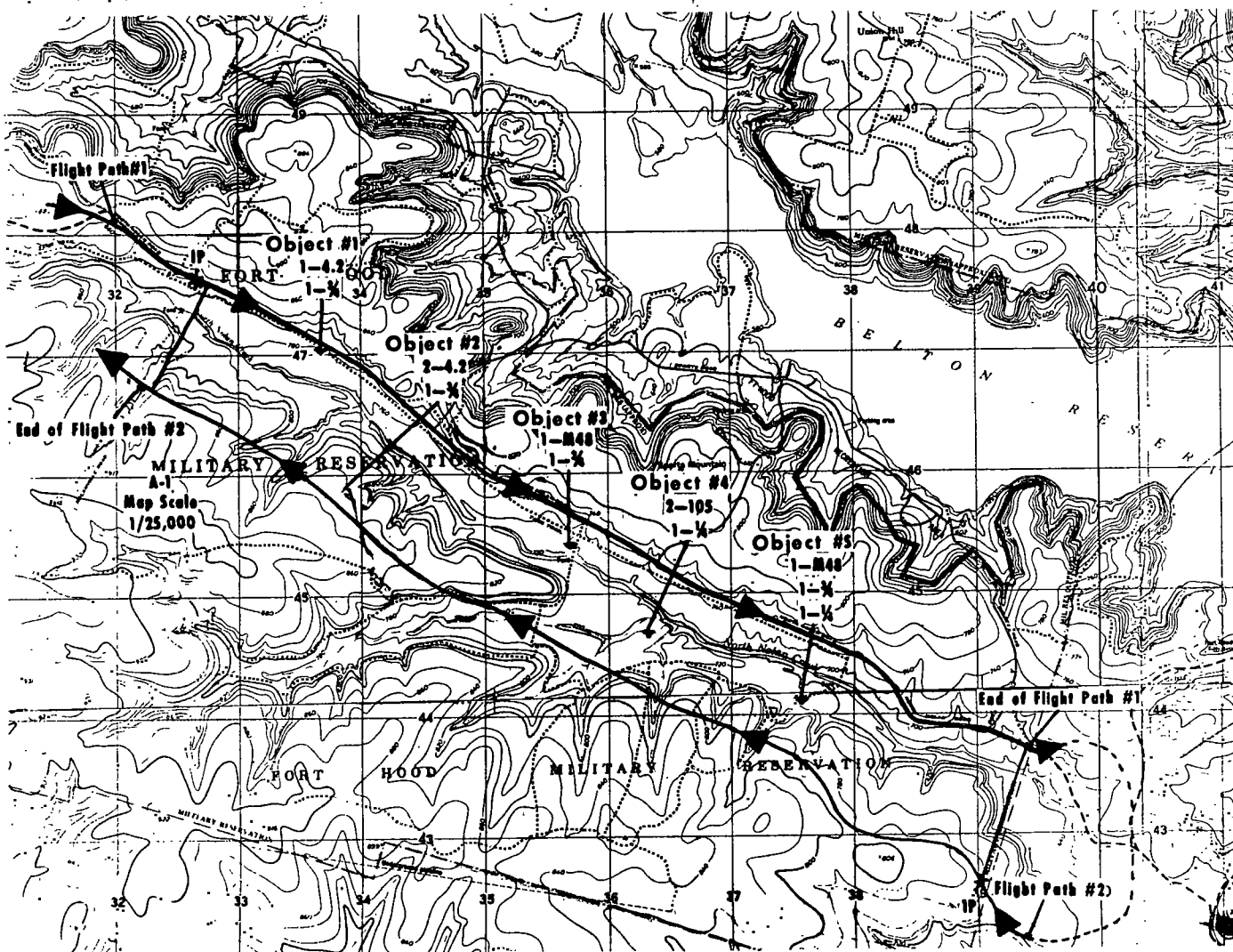


Figure B-39. Type course for object location training,
object area A-1.

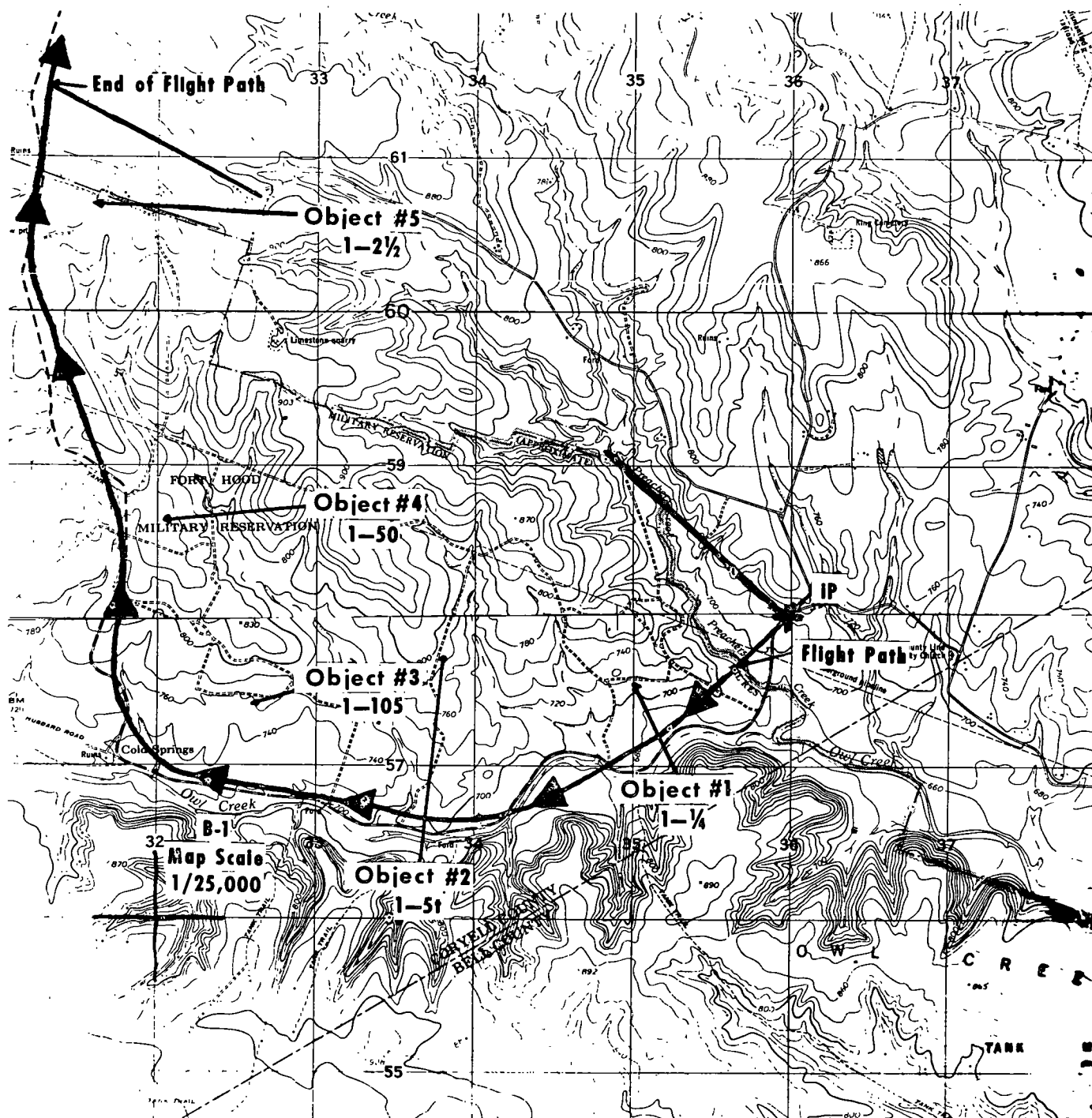


Figure B-40. Type course for object location training, object area B-1.

APPENDIX C

IN-FLIGHT REPORT

ANNEX A TO
DETAILS OF AGREEMENT
OF STANAG 3377

1. Purpose

An IN-FLIGHT REPORT is the standard form of message whereby strike, attack, and reconnaissance pilots/crews report mission results while in flight. This report is also to be used for reporting any other tactical information sighted of such importance and urgency that the delay, if reported by normal debriefing, would negate the usefulness of the information.

2. Format

USE STANDARD MESSAGE FORM HEADING (See Notes)	
FORMAT (Not to be transmitted)	EXAMPLE MESSAGE
IN-FLIGHT REPORT: Always at start of message.	IN-FLIGHT REPORT.
AIR TASK/MISSION NO.	3/A501.
A. LOCATION IDENTIFIER (only if necessary for clarification).	A. LC 7354.
B. TIME ON TARGET/TIME OF SIGHTING.	B. Target Attacked 1610Z.
C. RESULTS. Results of mission, brief description of observation, recommendation for attack/reattack if necessary.	C. Two tanks destroyed, one damaged; 20 tanks and troops seen moving west out of HOF 1615Z.

3. Notes

a. Procedure.

- (1) *Submitted by.* All units/wings in a strike/attack or reconnaissance role.
- (2) *Frequency.* As ordered by the requesting authority and/or at the discretion of the mission leader.
- (3) *Time.* As soon as possible after results are known, and aircraft is within radio range of a reporting post on the ground.
- (4) *Method of transmission.* Voice broadcast to appropriate reporting post or as briefed.

b. Precedence. As required.

c. Security. Code words established by local SOP may be used if necessary.



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By Order of the Secretary of the Army:

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Distribution:

To be distributed in accordance with DA Form 12-11 requirements for Aerial Observer training.

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